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*Proceedings of the annual meeting
of the New Jersey State ...*

New Jersey State Horticultural Society



**PRESENTED BY
THE SOCIETY**

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PROCEEDINGS
 OF THE
 NEW JERSEY
 State Horticultural Society,
 AT ITS
 Twenty-Second Annual Session,
 HELD AT
 TRENTON, N. J.,
 JANUARY 6th and 7th, 1897.



ORGANIZED AUGUST 17, 1875.

INCORPORATED DECEMBER 15, 1887.

1897.

THE NEW JERSEY MIRROR PRINT,
 MOUNT HOLLY, N. J.

93. 487
1897

APR 24 1897

LIST OF OFFICERS. 1897.

President:

Dr. J. B. Ward, . . . Lyons Farm, Essex County

Vice President:

I. W. Nicholson, . . . Camden, Camden County

Secretary:

Henry I. Budd, . . . Mount Holly, Burlington County

Treasurer:

Charles L. Jones, . . . Newark, Essex County

Executive Committee:

E. P. Beebe, . . . Elizabeth, Union County

D. A. Vanderveer, . . . Freehold, Monmouth County

I. J. Blackwell, . . . Titusville, Mercer County

J. B. Rogers, . . . Newark, Essex County

Horace Roberts, . . . Fellowship, Burlington County

Fruit Committee:

Thomas J. Beans, . . . Moorestown, Burlington County

John Repp, . . . Glassboro, Gloucester County

H. E. Hale, . . . Princeton, Mercer County

Charles Black, . . . Hightstown, Mercer County

Samuel C. DeCou, . . . Moorestown, Burlington County

Flower Committee:

E. P. Beebe, . . . Elizabeth, Union County

J. C. Williams, . . . Montclair, Essex County

Mrs. Tacie Lippincott, . . . Fellowship, Burlington County

Vegetable Committee:

T. F. D. Baker, . . . Bridgeton, Cumberland County

William H. Reid, . . . Tennent, Monmouth County

Charles B. Hornor, . . . Mount Holly, Burlington County

Legislative Committee:

Dr. J. B. Ward, . . . Lyons Farm, Essex County

T. F. D. Baker, . . . Bridgeton, Cumberland County

I. W. Nicholson, . . . Camden, Camden County

Delegates to State Board of Agriculture:

D. A. Vanderveer, . . . Freehold, Monmouth County

Charles Black, . . . Hightstown, Mercer County

LIST OF MEMBERS.

OF THE

NEW JERSEY STATE HORTICULTURAL SOCIETY.

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 Gerry Valentine, "

Bergen County.

E. S. Carman, Rural

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 Thomas J. Beans, "
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 Samuel S. DeCou, Trenton Junct'n
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C. A. Dalrymple, "
Henry Folk, Sparta
Warren D. Haggerty, Deckertown
D. M. Roe, Branchville

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E. P. Beebe, Elizabeth
N. W. Parcell, Elizabeth

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John S. Arndt, 903 N. 42d St., Philadelphia, Pa.
H. W. Comfort, Fallsington, Pa.
C. S. Davison, East Stroudsburg, Pa.
William H. Moore, Morrisville, Pa.
F. L. Mulford, Edgewood Park, Pa.
Walter Mulford, " "

Honorary Members.

Dr. F. M. Hexamer, 751 Broadway, New York
Prof. B. D. Halsted, New Brunswick, N. J.
William A. Manda, South Orange, N. J.
Prof. F. Lamson Scribner, Knoxville, Tenn.
Mrs. Mary Treat, Vineland, N. J.
Mrs. James M. Trimble, Montclair, N. J.
Mrs. E. Williams, Montclair, N. J.



MINUTES.

FIRST DAY:—MORNING SESSION.

TRENTON, N. J., Jan. 6, 1897.

The New Jersey State Horticultural Society convened in its twenty-second annual session, at 10.30 o'clock A. M., in the Supreme Court room in the State House, being called to order by Vice President I. W. Nicholson.

THE CHAIRMAN. The first thing on our programme is

WORDS OF WELCOME.

HENRY E. HALE, PRINCETON, N. J.

Mr. President and members of the State Horticultural Society:

The duty of bidding you welcome in the name of the Mercer County Board of Agriculture is a pleasant one. It is made so by recollections of the past, when your visit, coming like an oasis in the winter desert, abounded in fruits and flowers.

It is also made pleasant by what we expect from you on this occasion. The branches of industry and knowledge, you are striving to advance, are closely connected with the enjoyment and health of the great multitude of our own people and those of other lands.

Products of your raising are needed alike in the homes of the poor and rich.

Some grace festive occasions; others are silent expressions of regard or sympathy in times of sadness. Others ornament

our gardens, our lawns, our streets and parks day and night, furnishing fruit, shade and beauty. You have searched our land and gone to foreign shores, both to the east and to the west, to secure new or improved varieties. We know that you have given valuable time, careful research, prolonged and repeated observation in the various departments of horticulture, and have thereby increased your knowledge and made your labors more productive.

We believe that while you are with us, we shall derive some benefit from your efforts and researches.

To some extent, at least, as a result of your visit, our gardens will yield more choice products, our orchards more luscious fruits and our lawns more beautiful trees and flowers. As we hear of your successes, we shall have greater determination to succeed, and your failures, if any, should give us a timely warning. We desire also, if possible, to lend our aid to any plans for present or future usefulness. We hope, too, to make new friendships, among those of tastes kindred to our own, which shall year by year be of mutual pleasure and profit.

The programme you have prepared is replete with subjects of interest—a bill of fare promising the most tempting viands to satisfy varied and fastidious tastes. In short, we expect a pleasant and profitable time, and recollections and anticipations combine to inspire us to give you a hearty welcome.

RESPONSE BY VICE PRESIDENT NICHOLSON.

Mr. Hale and members of the Mercer County Board of Agriculture:

In behalf of the New Jersey Horticultural Society, we accept your cordial welcome to this beautiful city on the historic banks of the Delaware, and hope its session will be replete with interest to not only those in the state engaged in this pursuit, but that its influence may extend beyond its borders.

In the evolution that has taken place in the cultivation of fruits and flowers, the cultivator has produced both fruits and flowers, which exercise a refining influence upon all; their abundance prevents their restriction to any; the beautiful flowers and the luscious fruits being within the reach of all who may have a taste for each.

The Romans worshipped Pomona, believing she exercised a wonderful influence upon their labors, but we come here that the result of individual effort can be utilized for our improvement and advantage.

The situation of our state between the largest cities of the continent makes it of the greatest importance that horticulture should be pursued in the most enlightened and economical manner. We come here that experience and success may attend our future efforts through the information gathered in this meeting by those who may assemble here, whom we desire may contribute of their knowledge for the benefit of all in attendance.

Formerly in the forests of this state, the birds and squirrels gathered the fruits; now under the influence of horticulture, the hand of man, for a liberal return, does it for the gratification of those having a taste, the means for the fulfillment of their desires.

New avenues are continually opening for the skill and judgment of the horticulturist, to be used for the benefit of mankind, and we hope that in these efforts he may be liberally rewarded, as that after all is the great incentive to labor.

Again expressing our pleasure and obligation for this hearty welcome, we will close with the language of the poet:

"And howsoe'er our tongues may ill reveal it,
Believe our glowing bosoms truly feel it."

On motion of Mr. Rogers the Society's minutes as published were approved and adopted as the minutes of the last meeting of the Society.

The secretary then read his annual report.

SECRETARY H. I. BUDD'S REPORT.

Mr. President and Members of the New Jersey State Horticultural Society:

The report of the executive committee and secretary was presented to you last February, when each individual member received a copy of the proceedings of the last annual meeting. Collating and placing in shape the papers and minutes of our last proceedings, preparing them for the printer and correcting the proofs, occupied for a considerable period, the time and ability of your committee and secretary. The demand for these printed proceedings extends not only to Canada and Europe, but to English speaking nations of other continents, showing how valuable and interesting are the many practicable suggestions and facts eliminated by your wise councils.

Many organizations of similar character that are yearly held in other portions of this Union and in Canada, would seem to bring out all there is of interest in horticulture; but with the ever changing seasons, nature is ever revealing something new. Scarcely are we educated to move serenely, and in one course, before new obstructions appear in our pathway, causing us to fence about and seek in the depths of experiment and science, remedies for the manifold insects so rapidly propagating, that the ingenuity of man can scarcely keep pace in successful experimentation to head off their mischievous attacks. The pursuit of wealth through orchards of fruit has long ceased to be one of pleasure or profit to the majority of seekers, for few possess the patience to constantly, early and late, combat the ever present and the constantly renewing recruits to orchard depredators.

Beneath the destructive influences of blight during the past year, large portions of many promising orchards of Bartlett's and Clapp's Favorite, together with varieties not so extensively cultivated, finally and forever yielded up the conflict. The labor and waiting of a quarter of a century irretrievably

lost by a disease for which all the wisdom of our experimental stations and scientific schools have failed to find a remedy.

Twig blights in many of our commercial orchards have this year swept like a bezom of destruction, destroying thousands of baskets of fruit that were almost ready to be turned into golden dollars,—for this, no remedy. The destructive gods of the universe would seem to have had a conference and agreed to each attack its own particular kind of fruit; each failing to be destructive to all kinds, it would seem as if in their council they had created a common enemy by which the sap could be taken so successfully from every variety, that no vitality would be left to form either the peach, pear, plum, or apple.

A few years ago, some of our nurserymen coquetted with the trees and shrubs of California. Before they were aware, they had brought into our midst a viper, which sticketh closer than a brother, and multiplies beyond the rarest dreams of avarice. I was this year in an orchard representing many varieties of fruit, in which each variety was more or less affected by the San Jose scale, and if the orchard was not in the ownership of one possessed of uncommon vigilance, its net income of thousands of dollars per year would soon be a tale of the past. Their multiplication is so rapid and so covers every portion of trunk and stem, that in all measures to eradicate them there will always be some left to again spread over the surface from which their predecessors had been eliminated; so we might bring on in destructive array a vast army of enemies to vegetable life, who with bright helmets and burnished swords are ever ready to give battle wherever the vigilance of man for one moment relaxes.

Having prepared for you an extensive programme, covering the most of subjects that pertain to horticulture, it will be a waste of time for me to further occupy your attention with points that will be fully brought out in your discussion.

We have enlisted the services of some of your most successful orchardists, who will, from their experience of the past year, confer upon you much enlightenment to guide you in your future operations. From distant states we have succeeded in persuading several specialists who will, in their particular line of work, show you the new methods of strawberry and plum culture. While all lovers of ornamental plants and flowers will have an instructor in the person of one of the largest growers in the State, of palms and in-door plants. While our director and professors of the experimental station, will explain to you the character of new fungi and insects, and show you how to preserve from their depredations the valuable fruits and plants, the perfection of which is so necessary to the progress of your industry.

By means of the press, by means of farmers' clubs and granges, by means of farmers' institutes and other organizations, and by individual effort, the time of your meeting and the programme of your exercises has been generally diffused over this State and the adjoining counties of Pennsylvania.

If we could carry you one day back, we might be able to interest you in what is really a valuable part of horticulture, viz. :—Forestry. We could show you how Germany, by a perfect system of forestry regulation, is enabled by the cullings of her forest not only to preserve the integrity of their growth, but to thread their country with a system of stone roads, that not only passes through all their forests, acting as fine roadways to carry their products to markets, and as fire lanes to prevent the progress of fires, but furnish sufficient means besides to grade and macadamize their highways and adorn their sides with millions of fruit trees, a splendid example of the wonderful results of state regulation in all those affairs that concern the whole public, but which when left to individual effort results only in the destruction of not only what nature has given us, but renders abortive the labors of the painstaking farmer or horticulturist.

If we could only apply state regulation to all the insects and diseases that infest our orchards and to the fires that annually destroy millions of acres of our forests, untold wealth could each year be saved to the State or to the individuals that make up the State.

When will the millenium come?

There not having been any revision of our fruit list since 1884, your executive committee hath deemed it wise that at this meeting, on account of the great number of new and valuable varieties that have since then come into existence, to enter upon this duty in a systematic and thorough manner. Your fruit committee has instructed the secretary to send a tabulated list of fruits to each member to revise according to his best judgment, and bring their work before this meeting to be finally acted upon by the whole body of our members.

The beauty of a country is so dependent upon its shade trees, and so many new enemies are developing to destroy them, and so many of our elms and maples that have been the pride of a century are now forced to succumb to the insidious and the persistent defoliators, that your time cannot be more profitably spent than in devising some universal, applicable means by which their ravages may be arrested. The doom of the majestic elm has caused us to take refuge in the stately and hardy maple. But its territory is being invaded by a foe as destructive as that which is sapping the pride of our parks. In every city and town there should be tree societies formed to protect the magnificent trees, that now give grace and beauty to the streets. In places fine rows of maple trees, of many years' growth, are cut down in order to change curb lines. The reason that they are thus sacrificed—they have no friends. Under the rage for the new species of pavements, the conditions of healthy tree life are changed in having the water and air cut off by the impervious pavements placed over them. There should be some concerted provisions made either to have trees set in open spaces or large

surface around each tree left naked in order that the soil may gather moisture for the nutrition of the roots. Then they should be protected from the unwise attacks of the tree pruner, who, each year, can be seen destroying the beauty of our village and town shade trees, leaving naked trunks exposed where beautiful foliage should be drooping, giving graceful outlines to the trunks. Under the guidance of such an organization, the trees would also be protected from insect depredation, preserved from drought, the attacks of horses and mischievous boys and all the multitudinous enemies that are ever active.

For the contemplation of these and other things you have been called together—a congress of the wise men of this and other states—to deliberate upon subjects that are as vital to the wealth and prosperity of the nation as any that engages the attention of the representatives of the whole nation, now gathered under the dome of the Capitol at Washington.

It becomes our painful duty to record the demise of one of our earliest and most active members. The name of William R. Ward is familiar to you all. He died at his home in Newark, on the 3d inst., aged 54 years. This afternoon his remains will be conveyed to their last resting place.

His name appears among the list of members in the third annual report in 1878. Since then he has filled all of the important offices of the Society from president down. He was my predecessor as secretary and retired from same to assume the responsible and laborious charge of the State Horticultural exhibit at the World's Fair, at Chicago.

His earnest and effective work there, no doubt, drew heavily upon his vitality and served to hasten his death.

We all can testify to his lengthy and conscientious performance of duty.

On motion the report of the secretary was received and referred to the executive committee.

MR. DYE. Mr. Budd has referred to the Forestry Association very pleasantly, and I would like to say that the newly elected president of that association is here this morning, and when the proper time comes, I hope she will be given an opportunity to say something upon the subject.

THE CHAIRMAN. An opportunity will be given the president of the Forestry Association to speak upon that subject and also upon fruits and flowers.

MRS. J. C. S. DAVIS, Riverton, N. J., President of the State Forestry Association. As much as it would please me to say a few words on forestry, I would rather give my experience in horticulture and agriculture, but will not until later in the day.

THE CHAIRMAN. We will at a suitable time be pleased to hear from our friend.

TREASURER'S REPORT.

MR. CHARLES L. JONES. I will say in this connection that it affords me great pleasure to testify to the continued success of this Society, and particularly at the present time, we are standing better in active work than we have for a good many years and we can all take pride, knowing we are not losing ground at all in this matter.

CHARLES L. JONES, in account with N. J. State Horticultural Society:

1896. TREASURER'S REPORT.

Dr.

Jan. 6.	To Balance on hand,	\$130 06
	“ Dues from members, 1896,	67 00
	“ Appropriation from State Board,	300 00
		<hr/>
		\$497 06

Cr.

Jan. 3.	By Paid Totten & Kimble,	\$10 00
	“ “ I. Hale,	12 50
	“ “ L. D. Willard,	21 00
	“ “ E. S. Vail,	12 50
	“ “ H. H. Allen,	25 00
	“ “ expenses “	5 00
	“ Printing Annual Report,	115 60
	“ Salary of Secretary,	100 00
	“ Postage “	16 00
	“ Expenses of Messrs. Willard and Hale,	7 05
	“ Plates for exhibitors,	1 65
Jan. 27.	“ Expense Executive Committee,	8 50
Nov. 28.	“ “ “ “	12 50
Dec. 31.	“ Charles H. Folwell, printing,	5 75
	“ Secretary, bill for postage,	9 10
	“ Treasurer, “	2 16
	“ Mt. Holly <i>Mirror</i>	8 50
	“ “ “ “	3 00
	“ Janitor,	5 00
	Balance,	116 25
		<hr/>
		\$497 06

On motion the treasurer's report was received and referred to an auditing committee to be appointed by the chair. The following were so appointed : Messrs. Vanderveer, Beans and Beebe.

MR. HORACE ROBERTS, Chairman Fruit Committee. Several of the members of the fruit committee are on the regular programme for papers, so we have appointed one of our members not so engaged to report for us.

MR. SAMUEL C. DECOUR. I have been appointed to read the report but it is not ready and I ask it be deferred. The request was granted.

MR. H. ROBERTS. Our report as to the revision of the of the Society's fruit lists is not yet in shape, but will be later in the session. Report laid over.

REPORT OF THE FLOWER COMMITTEE.

BY MR. E. P. BEEBE, ELIZABETH, N. J.

Not having received any matter from the rest of the committee, I will read what I have.

I was not appointed chairman of the Flower Committee this year, and did not expect to make a report until a week ago. I received a letter from Mr. Williams, saying that he could not make one, and wished me to do it instead. What I have to say has been prepared since New Year's day. I realize what this report should be, though I am not able to do it justice, as this branch of the horticultural tree has so many seedlings and sports—home grown and foreign—with a vast army of seedsmen, florists and nurserymen putting on the market such an array of novelties that one is bewildered in thinking what to choose for his trial grounds.

These novelties are often disappointing, because we do not yet know how to treat them, or whether the soil on which

we are to plant, is adapted to their requirements. If we do not plant them, if we do not keep up in the march of progress, if we lag behind we are soon out of the race and our friends are familiar with those we have not seen.

The best in the market takes the best price. Competition everywhere. You might easily think

"That some men never sleep
Until they get their winding sheet."

We are no longer expected to believe what we see in print. We must see with our own eyes. We must cultivate with our own hands, to verify the value of a plant to us. As growers for the market we must keep up with the times, though we do not always realize expectations. For the home garden we may wait with an eye open and profit by the experience of others.

KEEP GOING.

If you strike a thorn or rose,
Just keep going!
If it hails or if it snows,
Just keep going!
'Tain't no use to sit an' whine
When the fish ain't on the line;
Bait your hook and keep on tryin'—
Just keep going!

When the weather kills your crop
Just keep going!
When you tumble from the top,
Just keep going!
'Spose you're out o' every dime?
Gettin' broke ain't any crime;
Tell the world you're feelin' prime—
Just keep going!

When it looks like all is up
Just keep going!
Drain the sweetness from the cup—
Just keep going!
See the wild birds on the wing—
Hear the bells that sweetly ring!
When you feel like sighin'—sing!
Just keep going!

—F. L. Stanton in *Atlanta Constitution*.

It is an art to grow flowers not congenial to our climate, and have them the year round—an art to blend and color,

change the form and curves of the leaf of the flower, to increase the size and variegations—an art to arrange them in groups of contrast, or blend in groups of harmony, to show their real beauty. This art creates a love for the beautiful, and the adornment of our homes in every way that money can supply.

Prof. Bailey gives the definition for the love of flowers as “An intelligent appreciation of beauty.”

Nature has dealt bountifully with us in producing an abundance of flowers for the summer months. Commencing with the wild flowers from the woods, the magnolias from the lawn, the peach, plum, pear and apple blossoms in the orchard, the May and June roses in the garden. Meanwhile the crocus and hyacinth, the tulip, narcissus and lilies have been peeping from the ground for us to appreciate their beauty and enjoy their fragrance. The iris, azalea, rhododendron, hardy and herbaceous peonies are here also—with hundreds of flowering shrubs—blooming from April to October.

We are promised some startling novelties in sweet peas the coming season. So far the dwarf sweet pea was next to a failure. The past season was not favorable to its development. A disease in the leaf of the violet has materially lessened the amount grown. New carnations are plenty. Each originator has the greatest wonder of the age. There are two new cannas, *Italia* and *Austria*, offered for sale this year at moderate prices for new importations. I have seen the flower of the *Austria*, which is yellow, with small markings in the throat with red. I have the plant growing this winter in the greenhouse, very stocky and promising. Here is the printed description of the flowers: The outstretched petals of *Austria* measure $7\frac{1}{2}$ to 8 inches across. They always have five petals, three of which are pure yellow, two slightly spotted carmine. The flowers of *Italia* are nearly as large, of bright golden yellow with a large blotch of bright scarlet on each petal in the style of Queen Charlotte. The lower petal,

however, is usually two inches and over in width. Their growth is simply majestic and they increase amazingly.

The Florence Vaughan, which I mentioned in my last report, will now have two rivals, and will supply all the yellow needed in groups of this favorite bedding plant. Marguerite carnations are good summer bedding plants to cut from. So is Achille the Perle; also the white and pink anemone, remaining in bloom until frost. I notice that few succeed with Cosmos—it grows so tall, breaks down even when staked, and the first frosts destroy the flowers.

Sweet peas did not bloom as well as usual the past summer, and my neighbor says the sparrows picked a large share of the unopen flowers from his vines.

The wild astor, in variety, made an unusual display of bloom during the Fall. So did the varieties of golden-rod, which were so much admired, that tons of bloom were carried home to decorate the church, the parlor, the table, for weddings, for balls, any and all entertainments.

Just when hearts begin to miss the lovely rose and violet,
Ere the snow of winter falls and the summer sun has set,
When beneath an autumn's wondrous blue the days in dreaming lie,
And the brooklet sings a melody of happy days gone by,
Then lo! from dusky meadow-ways a winning smile and nod!
And all the world is smiling, too, with the sunny golden-rod.

—*Alice J. Cleator, in Home Queen.*

Chrysanthemums out of doors made an unusual amount of bloom during October and materially lessened the sale of house grown plants.

Business, the past year, has been dull and unprofitable to the professional florist. The flower shows were well supplied with good flowers—rare and beautiful flowers—yet they failed in many places to draw the needed dollars to make both ends meet.

The new pink rose "Souvenir du President Carnot" is thought to be the coming greenhouse or garden rose—having received more medals and certificates of merit than any rose ever produced. Time will tell if it supercedes the pink

Bridesmaid now so popular as a florist rose. I saw in bloom the past summer the new climbing rose, "Crimson Rambler." It is really a profuse bloomer, a good climber, and worthy of a place in the flower garden. If its companion, the "Yellow Rambler," shall prove to be its equal in vine and bloom

"What a pretty pair they'd make
Upon the tree together."

Roses are cultivated in almost every garden, yet how few know how to properly care for them. First, know if you are planting a rose budded on some other root or grown on its own roots. A budded rose should be planted deep to cover the union of the bud with the stock, and prevent, if possible, the root sending up sprouts below the bud. These sprouts rob the bud of its vitality and the good roses are lost. So I say, plant deep on well drained, heavy soil, and cut back the top, to cause a strong new growth which will produce large, well matured flowers. The stalk bearing the flowers should be again cut back as soon as the flower fades. This will produce more strong shoots and good flowers. If the rose is a tea rose or a hybrid, you will in this way have flowers from June to November. Roses on their own roots, if *not* cut back, get too top heavy, and by the action of the wind the roots are disturbed, making the plant weak, and producing small flowers. A straggling, untrimmed rosebush is never pleasing to the sight. Better flowers, and more of them, are grown on low bushes, unless you give them a stake or tiellis for support. The new wood of climbing roses should be trained while growing, and the oldest wood cut away after blooming.

New Jersey is making great advancement in flora culture. Within her limits are some of the best rose growers in the world. A vast army of men, women and children are employed in the production of plants and flowers for the markets of the State and the two large cities near her borders from which the world is supplied. We will admit what CARMODY said in his speech, at the American Florist Convention, that

"Adam was the first man to *raise Cain*," but will not admit that New Jersey is second to any state in raising flowers. The love for flowers is increasing with the intelligence of the people, and the faith that the florist has in the future is manifest in the amount of glass structures being annually built. Raising flowers to make perfumery in this country is a new industry started in the South Atlantic States, and should be tried in this State. We have also lands adapted to growing bulbs such as hyacinths, tulips, crocus, narcissus—even the Bermuda lily, we should produce in our own country—what we need instead of importing.

On motion the report of the flower committee was received and placed in the hands of the executive committee for publication.

MR. BAIRD. Mr. Beebe said in commenting upon planting rose bushes that they required a heavy soil. My question is what course would he take if it were not heavy? We all like to grow rose bushes and we wish to use the soil we have.

MR. BEEBE. When we have light soil we get heavy to mix with it.

MR. VANDERVEER. I would like to ask Mr. Beebe if roses will thrive in soil where there is a good deal of coal ashes?

MR. BEEBE. Coal ashes contain a large per cent. of lime and lime is very essential. I do not allow any coal ashes to be wasted on my place. We just take out the cinders but never throw away any ashes. We have practiced that for twenty years.

MR. GOBLE. Do not let any one be deterred from planting hybrid perpetual roses on account of sand. I planted on a sandy loam and it has been pointed out as a success. Do not

let it scare you if the ground is a little bit sandy. If you have clay quite handy do not be afraid to throw a little of it in.

MR. BEEBE. Heavy soil makes them thrive the best but if I had sandy soil I would not stop planting them. The reason that the heavy soil is so much better, is that the rose bush has but a very small root, and if the soil is very light the top gets so heavy for the root the bush is apt to be destroyed. So when they come to me with complaints about their roses dying, we find the soil so loose that the bush in a heavy wind is laid over and a portion of the root destroyed. Many growers of budded roses do not seem to know any difference between a budded plant and one on its own root. The first thing perhaps they cut away is the bud itself. Then they will complain that the man who sold it "said it was such a nice rose, a Jack rose, and it is nothing but a single rose. They have been deceived. It is a fraud." They have allowed sprouts to absorb all the substance of the bud and it either absolutely died away or they cut it away because it was the weakest of the lot, and then they charge the nurseryman with this fault of the bush when it really was their own. I have brought up this matter to undeceive people and tell them where the trouble lies. If they are in heavy soil it will give them strong root vitality. You can get the best roses from planting budded bushes. Tell people how to care for them and have the benefit from them.

VEGETABLE COMMITTEE'S REPORT.

On motion, the report of the Vegetable Committee was deferred.

REPORT OF LEGISLATIVE COMMITTEE.

MR. NICHOLSON. When the bill was before the House making a state appropriation of \$1000 for examination of the

different fruit enemies, the President of the State Board of Agriculture and myself went before their Agricultural Committee and made statements why it was asked for. They expressed their gratification that we came and reported the bill unanimously and it quickly passed the House and Senate. Professor Smith received the appropriation and sometime during this session no doubt will give you the result of his examination into this matter.

THE CHAIRMAN. The next thing in order will be the report of the delegates. If there are any present they will either hand in their credentials or report to the Secretary. Those who have been appointed by agricultural or other societies will please report to the Secretary so their names may be recorded.

LIST OF DELEGATES.

State Board of Visitors to the Agricultural College—William H. Green, Succasunna; Robert M. Torbet, Paterson.

Burlington County Board of Agriculture—John M. Lipincott, Moorestown; Horace Roberts, Fellowship.

Camden County Board of Agriculture—Timothy Fox, Kirkwood; Albert I. Driver, Kirkwood.

Essex County Board of Agriculture—F. C. Goble, Verona; S. H. Burnett, Livingston.

Gloucester County Board of Agriculture—Asa Moore.

Monmouth County Board of Agriculture—Daniel Jones, Freehold; Samuel H. Fowler, Allentown.

Ocean County Board of Agriculture—H. B. Wills, Toms River.

Princeton Agricultural Association—Henry E. Hale, Princeton.

MR. BAIRD. A committee was appointed at last year's meeting to take into consideration the propriety and possibility of getting the classification changed on pears and thus obtain a reduction of freight. That committee was composed, I think, of Dr. Ward and John S. Collins. It is such a very important matter I would like to know what progress they made.

MR. COLLINS. I overlooked the report entirely until Mr. Baird spoke of it to-day. I have been laboring with this matter individually for several years. This classification rate is something of an ironclad nature. The different companies which compose the trunk lines have drawn the lines tighter. Years back I have been able to get some lower rates, but this year with the new order on the trunk lines I could not do anything. The committee ought to be continued to look after it. There should be a consort of action all through the United States, calling their attention to it. With the quantity of pears that are planted in New Jersey, if there be little outlet for them except the local market, it is a question whether they can be profitably grown. Pears, you know, are classed as second, while apples are fifth. The rate is 25 cents a hundred pounds on apples and 60 cents on pears. The difference is ability to ship or not.

THE CHAIRMAN. The matter of classification will be deferred until to-morrow when Dr. Ward, the President, will be here.

MR. BEEBE. I have a specimen of the leopard moth and larva and I will pass it around. I put it in this box where it deposited perhaps a half-teaspoonful of eggs. They are now dried up. It lived about two weeks. The larva I took out of an elm tree about a month ago and it retains its color and nearly its size. It is evident that it has grown enough to probably pupate the following spring.

MR. HALE. Perhaps if we look at this leopard moth we

will know it when we see it again. I do not know whether it is desirable or not.

MR. BEANS. (It might be desirable to have it put in a good strong box.)

THE CHAIRMAN. Mr. Beebe, please enlighten us in regard to this moth?

MR. BEEBE. I am hardly competent to tell all the damage it has done in the northern part of this state. Professor Smith will be here during the session and will tell you all what it is doing. The first specimen I obtained was in 1893. It was found in a pear tree loaded with fruit. It commenced on one side and went right around the trunk. I did not know what it was and I sent it to Professor Smith and he named it. I have had many specimens since. Since then it has been very abundant in elm trees. The moth must fly a great distance to deposit its eggs on the branch or branches.

MR. ROGERS. It flies at night.

MR. BEEBE. It makes a track not larger around than a lead pencil. It takes two or three years for them to come out, so you never find the worm in the present year's growth. Prof. Smith gave us a bulletin on that. Perhaps some of you have read it. It is destroying our elm trees and most other varieties, especially maples, by cutting them. They have been very destructive with us. They are also working badly in the fruit trees. They have in some cases gone into the body of the tree and worked right up. The worst is we cannot see them until the tree is ruined. The worm works entirely beneath the bark in a circle until it has cut nearly around the tree. Then the bark becomes dry and discolored. You commence to cut out and you find your tree is ruined. Quite a number of trees break off within a foot of the ground.

MR. ROGERS. I did not know that the moth extended over fifty or sixty miles from the city of New York.

MR. JONES. I can show you a place where it has gone 300 miles. I know about the ravages of the moth in the White Mountains. I saw them there in abundance about a year ago, the matured moth the same as Mr. Beebe has here. In regard to the time that this little moth has been here (Mr. Beebe says about three years) a friend of mine, a clergyman from Newark who is very fond of sights with a microscope and of studies of the different insects, six years ago caught the moth from elm trees in front of my house at night by electric light. I have in front of my house four elm trees twenty-two years old, and there is hardly a limb that has not been stung by these insects. It has evidently come here to stay and is doing a great deal of damage. It is in my pear trees the same way. Yesterday I cut off two or three limbs which were completely girdled.

FREE SEED DISTRIBUTION.

MR. BAIRD. I would like to offer the following:

Resolved, That the distribution of seeds by Congress is in itself a wasteful expenditure of public moneys, as the seeds thus distributed are from my observation, in nine cases out of ten, not even planted.

Resolved, That a copy of the above resolution be sent to each of our Senators and Representatives in Congress requesting them to use their influence against this item of unnecessary expense.

Mr. Vanderveer made a motion that the above resolution be received and referred to the Executive Committee.

MR. JONES. In that case there will be no action taken until too late to effect anything. It is a very important matter and is worthy of discussion. From my own little experience I consider it a nuisance. I think the seeds they distribute are very seldom used and it is an important subject for the State Horticultural Society to act upon. Should we adopt this

resolution, a copy of it under the seal of our society should be sent to our Senators and Representatives in Congress that they can take action intelligently upon it. Before doing so it should be discussed pro and con.

THE CHAIRMAN. The question is on the adoption of the resolution as offered by Mr. Baird.

MR. E. ROBERTS. I do not know as I am in favor of it. Our home supplies are better than they are in many places. We are contiguous to excellent seed growers and none of us know the want of good seeds, having the facilities of obtaining them easily. There are other people not so well favored, and lots of them, and they come from the south and southwest and clamor for this appropriation. I am not sure but it does some good in those places. So far as we in New Jersey are concerned, I do not think it is of much value, but oh, my! the many things that we could put our fingers on in our municipal government where we spend our money far worse than this.

MR. BEEBE. I was in hopes last year would end it. If the seeds sent were such as we use in New Jersey it would not be so bad, but as it is the money is actually squandered. What do we want with broom corn or sorghum seed in New Jersey. They are not cultivated here. I received a package of seeds several times when I was in the Union County Board of Agriculture and I never could give them away. They are the rubbish of some seed house sent out indiscriminately just merely to waste the money. It is also a waste of seeds. About four-fifths of what I received and distributed were fed to the chickens. When we planted some of them we lost our time. Many people came to me and said the seeds would not grow. I would not take a package of them and give to my best friend. Nor would I plant a package of them upon my own farm. I have not seen anything new or desira-

ble in any of the seeds sent to me. I think it is a perfect nuisance. We ought to press upon our representatives the dislike we have for these seeds, and this Horticultural Society should take some action upon it.

MR. GOBLE. The worst feature is they arrive at a time of year too late to plant, as you get on the fourth of July what should have been planted in the month of April.

MR. SAMUEL C. DECOU. I cannot say that I agree with my friend Goble in regard to this seed question. Some of them turn out very satisfactory, especially tomatoes. I think the distribution is a good thing. Many would not get them for trial if they were not given to them, and as our friend has said there are many worse uses that our money is put to. It would be better to remedy this matter than to do away with the whole thing.

MR. COLLINS. There is no part of the land where we cannot get one of the seedmen's catalogues and select what we want and have them forwarded by mail. I consider this to be a political matter. I think it a nuisance and an imposition and not the proper thing to do. I am not in the seed business. I have none to sell.

MR. E. ROBERTS. Brother Collins here, a neighbor of mine, occasionally plants some sugar corn. Nearly every variety of corn we plant in our section was grown from seeds received in this way.

MR. VANDERVEER. Many persons want the seeds. I am secretary of our County Board. Year before last they sent me at Freehold eight mail bags of seeds, two bushels to the bag. I had notices published in different papers of the county that I had a supply of government seeds and I soon got rid of

them. I had about two hundred applications more than I could fill.

MR. TERRELL. It seems to me they do some good. There is no doubt, either, a great many things are done by the Legislature which are worse, but we are not here to regulate that. It is a question of economy. My friend here speaks about the far west. It was my fortune or misfortune to live twenty-five years in the west, and in regard to the distribution of seeds, I know something from personal contact with it. As has been stated here they arrive there at a time too late to use them.

MR. L. J. FARMER, of New York. I wish to say that I think, not only is the practice wrong in distributing these seeds, but the government comes in competition with private individuals. I think there is competition enough in that business already. You can get seeds very low. They are almost given away. I think it would be just as right for the government to distribute small fruit plants as to distribute seeds.

MR. BLACKWELL. I think this practice a bad one.

MR. HALE. Have had very good seeds from the department. I have also received some very nice grape vines from Washington.

MR. BAIRD. The original idea was to introduce something from foreign countries that might prove valuable for use, but the enterprise of our own citizens is ahead of government. We make our garden about the first of April and we get seed packages about the Fourth of July.

MR. BLACK. This free seed distribution, as conducted at the present time, is an abuse of a good idea. There was not a single article sent out in the last spring's distribution but

what was old and had been in cultivation from two to five years and some for generations. Now the government is in the plant and tree business the same as in seeds. I, personally, am waiting to receive a graft from the Mammoth Black Twig apple. It appears to me it would be better to put this resolution so that we should receive new seeds, or seeds that are worthy of trial instead of condemning the thing entirely.

MR. BEEBE. We have to condemn the thing we are handling and ask for something new. If we can stop getting what we do not want, we might then get something desirable. We have either got to vote for the resolution or vote it down. They are making free distribution when and as they please, and we are to take it or not. If we received anything that would be of benefit to the people I am sure we would not vote it down.

MR. NICHOLSON. I was recently in the agricultural department at Washington. It is trying to introduce the cultivation of the citron in the southern states; the large citron fruit that is preserved and brought here and used largely in making cakes and mince pies, and I also saw the parent trees of the Naval oranges which are now cultivated in Florida and California. They were distributed by the government by thousands.

MR. DECOU. The one item of Naval orange would go far toward the whole expense of the distribution.

On motion, the resolution in regard to the distribution of seeds was passed.

APPOINTMENT OF COMMITTEES.

The Chairman announced the following committees: Committee on Nominations, Messrs. D. A. Vanderveer, Emmor Roberts and I. J. Blackwell. Flower Committee, Messrs.

Beebe, Hornor and Taylor. Fruit Committee, Messrs. Black, Repp and Beans. Vegetable Committee, Messrs. Horace Roberts, S. C. DeCou and David Baird.

LESSONS ON SPRAYING, 1896.

THE CHAIRMAN. In the absence of the President, we will now have some Lessons on Spraying, by Mr. Blackwell.

MR. I. J. BLACKWELL, Titusville, N. J. I would much rather listen to some one else on this subject. Perhaps there are others here who know a great deal more about it than I do. I think it is an important one and not thoroughly understood. If we would go out to-day and examine our fruit we would find that a large percentage of it is never sprayed. The difference in price between sprayed and unsprayed fruit is about 15 to 20 cents a bushel. In Northern Jersey, where the land is strong and has plenty of potash, fruit will grow much better without spraying than in South Jersey, where the land lacks potash, and where it should be sprayed. At the present time there is hardly anything in my experience that it is not beneficial to. Nearly all fruit trees and vegetables, some time or other, come in contact with some disease that spraying benefits. If I understood our committee I was not only to give my experience in spraying, but to try and draw out the people who listen so as to have them tell us what their practice is. I have thought considerable about this and have written down a few remarks, which I will read.

SPRAYING.

New Jersey has the credit of being a fruit growing state. In her early history is reported her fine production of grapes, peaches, apples and other fruits. These were not the fruits of the present time. No doubt by grapes were meant the wild ones of the woods and the other fruits, wildings or acciden-

tals. Even so late as the present century many orchards were seedlings or ungrafted trees.

In my boyhood days the white Doyenne was about the only pear of the higher grade to be found in our vicinity, while the apple orchards were a miscellaneous collection of varieties. The leading grafted fruit being the Newtown Pippin. Apples were grown principally for the production of apple brandy, the still-house being found in every section. The pear was little grown.

The commercial peach orchard did not come until the present century and there was but little demand for the fruit. About fifty years ago the farmers began to find that apples and peaches were sometimes profitable, and the planting of orchards commenced. In the fifties Patrick Barry began his tour of the fairs. He spoke on the planting of fruit trees, and the sixties found the people setting great orchards of peaches, plums, pears, apples, quinces and acres of grapes. As a result of such planting of the better grades of fruit trees and vines came plenty of fruit.

The people became educated to its use. The Bartlett pear, the Spitzenburg apple, the Catawba grape, the Old Mixon and Crawford peach were here, and the people liked them. The finer the fruit the better the price. The industry extended and so did the insect and fungus diseases. The apple for the still was not wanted to keep, and if it was scabby or wormy it would make applejack and the August pear would cook. The codling moth became a serious enemy to the apple and pear in the sixties. The curculio was putting in his work early in the season, and the fruit grower began to consider how to destroy the insects.

At the meeting of the American Pomological Society, held in Philadelphia in 1882, Prof. C. O. Riley advised spraying with kerosene emulsion to destroy codling moth. The pump was the Excelsior and those who had faith enough to try the experiment found it tedious work, yet when well

done it was effective. Later followed the spraying for fungus diseases, especially leaf blight. The ammoniacal solution, the easiest to apply and effectual on leaf blight of apple, pear, grape, quince, potato, eggplant and probably on most trees and plants, including lima beans, or most of the legume family. The Bordeaux mixture followed quickly the ammoniacal solution, equally effective and less costly. The arsenites soon superceded the emulsion for the codling moth. The kerosene emulsion is a perfect remedy for the pear psylla, and while our pear and apple trees when not sprayed lose their leaves in August and September, the fruit all covered with scab so it can scarcely be sold. Our plums rot just before they get ripe. The Biggarreau cherries are sure to go if a moist spell comes, and also our sweet potatoes when bedded for plant propagation, especially the red varieties. If sprayed with the arsenites when the early blossom is just off, we are pretty sure to have the fruit hold on to maturity, and if at the same time the Bordeaux mixture is added and repeated every time we have a heavy rain, say until the middle of August, with early varieties applying, after the fruit is gathered, we are pretty sure of fruit clear of scab. So that the fruit grower of the present time finds a good spraying outfit one of the necessities, and one of the best parts of the outfit is perfect faith in its work. I want to impress on all that a very few days' delay with the arsenites will spoil the effectiveness of the work; that after the fungus diseases obtain a foothold it is hard to get them off; that imperfect work does not pay; that spraying and manuring are two things absolutely necessary. The land may be rich, it may be cultivated to any extent, yet perfect fruit of the apple and pear cannot be raised in New Jersey without the spraying pump.

On motion the paper was received and placed in the hands of the executive committee.

MR. E. ROBERTS. Speaking from experience, I can full

endorse the substance of that paper and I believe it to be a fair statement of the facts of the case.

MR. BLACKWELL. I believe he is a firm advocate of spraying. I was called with Mr. Beebe to judge the fruit at the Mount Holly Fair. Mr. Roberts took most of the premiums for fruit. His fruit was sprayed and the other was not. We are in the habit of spraying our apple and pear trees after we gather our fruit. We work this year for next.

SAMUEL A. MILLER, Deckertown, N. J. I would like to corroborate what Mr. Blackwell said about spraying not being as necessary on mountain lands for the apple. We can raise the most perfect apples, and a large percent of them will be free from worm or scab without the spraying. I hope to have a few samples here this afternoon to spread upon the table.

E. ROBERTS. It is true you are not troubled with the scab. You will have an enormous crop but ordinarily in the autumn, notably the Baldwin fixes you by falling off when it has not matured. If you will spray the trees well with the Bordeaux mixture during the summer they will hold on, mature better and give more satisfaction.

MR. MILLER. The Baldwin is not so with us. Some drop but they get their color. I am very glad to know that can be remedied by spraying. I would like to try it on some varieties.

THE CHAIRMAN.—Mrs. Davis will you please favor us with a few remarks?

MRS. J. C. S. DAVIS. I bring you all the greeting of the New Jersey Forestry Association. Our work is very much in touch with your own. It is the care of the water courses of the State and its trees and endeavoring to do away with the fires. I would like to talk awhile about trees, but I have

something to bring before those who are farmers' wives. You are ladies to be envied above all others in this world, because you have so much to enjoy in common with your husbands, being able to get so much out of life if you go about it in the right way. I cultivate but one acre and a half of ground for a family of seven people. I commence in the early spring—cannot give you any dates, as I did not expect to appear before you this morning. Starting in the spring with asparagus, from then until the same time next year we are never without all the vegetables of the season. The work is all done by one man, a German gardener. Cannot give you the dates of planting, but living along the Delaware it means one week earlier than on most farms in New Jersey. From that acre and a half my family is supplied with asparagus, next spinach and then peas. We have potatoes by the 20th of June; about the 26th of June tomatoes, then follow lima beans, cauliflower, snap beans, cantaloupes, sweet potatoes. Am very particular as to the crop of white potatoes. Always try to have forty baskets, and this gives us enough for extra demands. Have always more than we want and the surplus I can give away. This land supplies the family with everything that is required until the early autumn when fifteen sashes are started with spinach, celery, early cucumbers, radishes, and we use these until it becomes too cold for cold sashes. Salad develops perfectly in cold weather, when few people are having a home supply. Have a small bed in the cellar of my house which gives us from three to four quarts of mushrooms every few days. In the conservatory I start, on the beds where I raise my spring plants, and my winter vegetables, growing cucumbers, tomatoes, salads and small onions, planting in plain boxes and using no other heat than the waste steam from my house. When the house is too warm the man turns the heat into the conservatory and it is kept moderate all the time. I follow this up by my early plants for the spring. I get from that acre and a half all the raspberries I

need and three varieties of strawberries, early middle and late.

Right here I want to tell you about the experience a friend of mine had, a gentleman named General Potter. We meet together in forestry work. He had the fortune or misfortune to be left half of a mountain in the state of New York. When he heard of this legacy he was very much troubled to know what to do with it. He held it for two years when one of his neighbors, a nurseryman, having a large quantity of chestnut trees sold them to Gen. Potter for a small sum. After planting them on his mountain they were left without any care other than to look after them occasionally in the springtime. At the expiration of eight years the returns from this young nut grove on the mountain exceeded what he got from his Chester county farm in the highest state of cultivation.

Yesterday I met one of our most successful nurserymen in the suburbs of Philadelphia, who said he came to New York an emigrant with a mother and four little brothers and sisters and the only welcome they got was the shade from the trees in Castle Garden. After securing a house, which was very near the garden, it fell to his lot to mind those children. One day while there he was just in the act of snapping a little tree when a gentleman said: "Little boy that tree does not belong to you. If you will allow that tree to grow some day it will be as large as the one you are under." He was frightened and left the tree alone and went home. He naturally became interested in this little tree and determined when he was able to work it would be among something that grew.

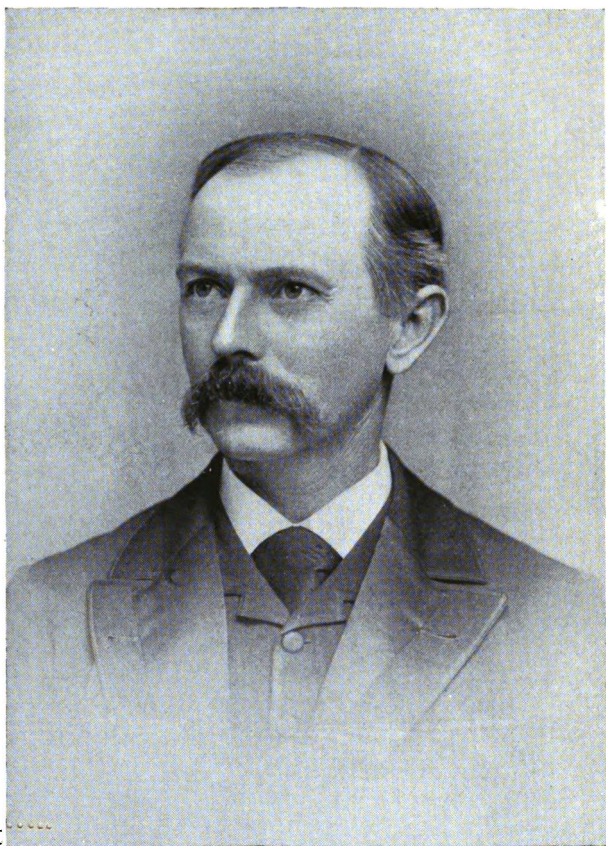
MR. BAIRD. Were these chestnut trees grafted or seedlings?

MRS. DAVIS. I do not know. The income was from the chestnuts sold in New York and Boston for dressing meats.

THE CHAIRMAN. The address has been very interesting, and it is a great pity that more of the farmers' wives are not here to listen to it. I thank you for your kindness.

On motion the meeting adjourned until 2 o'clock.





WILLIAM RANKIN WARD.

FIRST DAY:—AFTERNOON SESSION.

The meeting was called to order at 2 P. M., Vice President Nicholson in the chair.

THE CHAIRMAN. There is a paper upon the death of Mr. Ward which will be read.

Mr. J. B. ROGERS. When we were informed in the upper part of the State that our late associate, William R. Ward, had been stricken with an illness from which he would probably never recover, some members of this Society asked me to prepare a paper of his labors with us.

William Rankin Ward was born in Albany, New York, November 5, 1843. His father, Dr. Isaac M. Ward, while residing in Albany, became intimately acquainted with the then noted horticulturist, John Wilson (who about the year 1857, introduced Wilson Albany strawberry) and in 1845 Dr. I. M. Ward removed to what is now known as the home farm, situate immediately to the west of the Waverly State Fair Grounds, and began the planting of fruit orchards and the cultivation of small fruits.

W. R. Ward received the rudiments of his education in the schools of Newark and was then sent to a preparatory school in New Haven, Connecticut, at which place he fitted for College, but instead of continuing his studies, returned home and assisted his father in horticultural pursuits.

About twenty-five years ago Mr. Ward purchased his home place, where he died, and where he continued his horticultural interests.

He therefore could claim half a century among the fruits, and the horticultural education he received qualified him for the responsible positions he held in our society, and those related to agriculture in other State boards.

Mr. Ward's membership began in 1873, at the third annual meeting.

In 1879 he was elected a member of the Executive Committee; appointed on committee on native fruits, and also took part in discussions on the codling moth, varieties of apples to plant and strawberry culture.

The Society's report for 1880 is published as a part of the proceedings of the State Board of Agriculture, and is so condensed as to give little information, and no mention can be found of officers elected.

In 1881 he was appointed a member of Fruit Committee and read a paper on "How to Sell Fruits."

Mr. Ward was elected President to succeed Mr. John Collins in 1882 and again in 1883.

In 1884 and 1885 he was elected on Executive Committee and in the latter year read a paper entitled "Preservation of Fruit by the Use of Ice."

From 1886 to 1890 he acted as chairman of Executive Committee.

The fifteenth anniversary meeting of this Society was held at New Brunswick, this being its birthplace, on September 22, 1890, at which time E. Williams, our first secretary, said, "I tender my resignation as your recording secretary. My work is done. The record is made." Mr. Ward was then appointed acting secretary. In 1891 he was elected secretary.

On July 28, 1892, a meeting was held in Trenton, for a conference between the Executive Committees of the State Board of Agriculture and of this Society, to name a person to collect and take charge of the horticultural interests of this Society, and of the State at the World's Columbian Exposi-

tion, Chicago. Mr. Ward was chosen for this responsible position.

On December 14, 1892, Mr. Ward made his report as secretary and closed it with these words: "Let no man live for himself." It may truly be said, he who penned this sentence did not live for himself. The care, labor and anxiety incident to the horticultural exhibition, weakened him constitutionally and was probably the commencement of his illness, which on Sunday last, January 3, 1897, terminated in his death.

The success attending the Chicago exhibit is fittingly portrayed by a quotation from Secretary Budd's report to this Society, January 3, 1894: "Mr. Ward's energy, coupled with the ready response of producers in different portions of the State, made New Jersey's display a bright star in the constellation of numerous states and foreign nations."

January 4, 1894, Mr. Ward made a report of his labors at Chicago, in a paper read before us, entitled "New Jersey Horticulture at the Columbian Exposition." At the conclusion of the reading of this report, this Society, by a resolution, tendered Mr. Ward their thanks.

Mr. Ward never met with us again. The remaining two years of his life were years of feebleness. At this hour bereaved hearts are assembled at the home, where for many years he has resided. The last sad rite is being performed, and in a short time all that is mortal of our late associate, William R. Ward, will have been consigned to Mother Earth. "Dust to dust; ashes to ashes." Yet we will ever cherish the memory of him who in life did so much for us.

As one by one, we are called from earth, may we not hope that we will again see our missed one in life everlasting.

On motion of Mr. Jones the paper just read was ordered to be printed in full in the proceedings of this meeting and

that a copy of it be sent to the family of the deceased. The same was unanimously carried by a standing vote.

NEW FUNGI.

THE CHAIRMAN. As Prof. Voorhees is not here, Prof. Halsted has kindly volunteered to take his place and he is prepared to proceed now.

PROF. BYRON D. HALSTED, STATE BOTANIST.

The title under which your Executive Committee has asked me to speak to you may not be adhered to very closely. There is one new fungus of note that deserves consideration, namely, the Asparagus Rust; but other than that the fungous enemies of the past year have been old ones. The Pear Blight is getting so common and destructive that it may well come up for review at this time. Another orchard enemy that is gaining in importance is the root gall of the peach, and will be briefly considered. The closing minutes of the present talk will be devoted to a consideration of the merits of a new fungicide, compounded like the Bordeaux mixture but having the lime replaced by potash.

DISEASES OF THE ASPARAGUS.

Up to the present year there have been but few complaints of fungous troubles with the asparagus. Early in September the growers of this crop became much exercised over a premature maturing of their asparagus fields, and sought the experiment station for advice. The trouble was a rust that had been so general and complete in its attack as to warrant the alarm. Within a week after, an examination was made of fully two hundred acres of asparagus plants, a circular, essentially as given below, was issued to the press of the State and other newspapers that circulate in New Jersey.

NEW JERSEY AGRICULTURAL EXPERIMENT STATIONS.
AN OUTBREAK OF THE ASPARAGUS RUST.

General Appearance of the Field. When an asparagus field is badly infested with the rust, the general appearance is that of an unreasonable maturing of the plants. Instead of the usual healthy green color, the field has a brownish hue, as if insects had sapped the plants or frost had destroyed their vitality.

Close View of the Plants. Rusted asparagus plants, when viewed closely, are found to have the skin of the stems, both large and small, lifted as if blistered, and in the ruptures of the epidermis dark brown spots are readily seen. These brown dots or lines are of various sizes and shapes, and remind the close observer of similar spots in the broken skin of stems of grains and grasses and of the leaves of corn, also due to rusts, but not the same kind as that of the asparagus.

Nature of the Rust. The asparagus rust is due to a fungus (*Puccinia asparagi* D. C.,) that is, a minute plant consisting of microscopic threads which grow through the substance of the asparagus plant, taking up the nourishment that is needed, and finally breaks through the surface to bear the innumerable brown spores that give the dark color to the spots on the asparagus skins. This is the last stage in the development of the rust fungus, and as such remains over the winter. When the warm, moist weather of spring and summer comes, the spores above mentioned germinate, and a new lot of asparagus plants may become infested.

Treatment of Infested Fields. There are two general methods of checking the rust, namely, by destroying the spores and by preventing their growing upon, and getting a foothold in, the substance of healthy asparagus plants. The rust fungi are among the most difficult to check—by protecting the plants they feed upon—by means of fungicides, Bordeaux mixture, etc., sprayed upon them during the growing

season. While something may be hoped for with the spraying pump in July and August, the chief method of eradication lies in the destruction of the spores in the fall. This can be done in a very simple and effective manner by carefully gathering all the parts of the asparagus plants that are above ground and burning them. It would be a waste of time to stack the tops and leave them to natural decay; and to place them in manure heaps would be still worse. The only safe thing to do when a serious enemy like this is in the asparagus field is to burn the plants even to the last scrap that can be gathered up. Let this be done at once, for any delay means the breaking up of the brittle, rusty plants and a generous sowing of the spores upon the ground. If the fire could go over the whole field and burn all the small as well as the large pieces, that would be the best of all.

This autumn burning should be done by every asparagus grower, even if the rust is not yet seen by him. This enemy may become very serious if thorough measures are not taken at once and by all who are engaged in asparagus culture.

To those who may wish to add to the burning process the spraying of the summer-growing plants—not the spring shoots for market, the station will have something to recommend later on, but the only thing to do now is to burn the “bushes.” Instead of “arbor day,” let it be a *smoke day* for the whole State, or wherever there is an asparagus patch.

BYRON D. HALSTED, Botanist.
New Brunswick, New Jersey, September 18th, 1896.

Since the issuance of the circular correspondence has been held with a large number of the botanists and horticulturists in experiment stations and elsewhere in the United States with the result that, thus far, the rust has been reported from New England generally, Long Island and Delaware. A personal examination has been made in our State, and the rust is abundant in all localities that have been visited. No one

from the middle, prairie or western coast states reports the presence of the trouble, and from this it would appear that at present the rust of the asparagus is confined to the Atlantic Coast States north of Virginia.

The large growers in South Carolina became much interested in the outbreak and asked for specimens of the rust, which were sent them with the precaution that they were all thoroughly poisoned by soaking the blistered stems in a full strength of corrosive sublimate. Specimens afterward received from the South all showed no signs of the rust. It is interesting to note the same growers, although assured that they did not probably have the rust, at once concluded to burn their brush, as recommended in the above circular and thus run as small a risk as possible of having their fields injured by the new enemy that has come so suddenly upon the northern asparagus fields.

In looking up the history of this *Puccinia asparagi* D. C., only one publication of its having been found in the United States is thus far discovered, namely, in February, 1880, in the "Catalogue of the Pacific Coast Fungi," by Drs. Harkness and Moore. In a recent letter received from Dr. Harkness he kindly informs me that the rust was found near Sacramento, and regrets that no specimens were preserved. This was over a quarter of a century ago, and it is strange that it has not been collected since that date. It seems to be the fact that the cryptogamic herbaria of the country were without an American specimen of the asparagus rust until the present outbreak.

The writer has never met with any species of rust that was so overwhelming in its attack. Fields, for example, of a dozen acres would not have a plant and scarcely a square inch of surface of a plant free from the pustules. It attacks all ages of plants, but the older beds turned brown first and the last to lose their usual green color were the seedlings. All the varieties of asparagus seem to be equally susceptible to the rust with the exception of the "Palmetto." An examination

of several fields of this variety, sometimes growing along side of other sorts, leads to the opinion that upon a basis of one hundred the "Palmetto" would give a percentage of sixty for rustiness.

When once seen the rust is not easily mistaken for any other disease. There are, however, two fungous troubles of the asparagus that have been misleading. One of these causes brown spots that are nearly circular upon the stems, suggesting along with the yellow of the surrounding surface the coat of the leopard. The second is an Anthracnose (*Colletotrichum* Sp.) and produces multitudes of minute dark specks upon the stems. It develops later in the season than the rust and is much finer in its growth in every way.

PROF. HALSTED. Are there any questions which any one would like to ask in connection with the asparagus rust?

MR. BEEBE. What effect has salt upon this rust?

PROF. HALSTED. I have not tried it. I could not give you any definite information about the application of salt, but reasoning from a knowledge of other rusts, I should think that the salt would not be of any use.

MR. J. S. ROBINSON. Would lime have any benefit?

PROF. HALSTED. If the spores were lying upon the ground and the lime came in contact with them it might. I have not fully answered Mr. Beebe. If he had in mind that rust was produced by spores in the soil that treatment might be beneficial, but if it is due to the atmosphere it would not have any effect.

MR. BEEBE. Whether it would have any effect upon the rust on the stalk. We sometimes destroy the asparagus beetle by spraying it with salt water. A good many people do not

know how to apply the Bordeaux mixture and they would not do it right if we tell them ten times over.

PROF. HALSTED. I cannot give you any help on that. If this rather strong solution of salt should come into contact with the stalk it might have some effect.

MR. BAIRD. You spoke of spraying in July. Do we understand then that it does not attack it before that?

PROF. HALSTED. It does not do it any harm. The shoot having this fungus on is probably just as good to eat.

MR. BAIRD. It would make the shoot you cut unsightly.

PROF. HALSTED. Not necessarily. It is not a very rapid grower. It does not come to maturity for quite a few days. It gets all through the grass before it turns yellow.

MR. VANDERVEER. It only affects the plant after it is ready for the market.

PROF. HALSTED. Your shoots for the market will be smaller on account of its damage to the foliage.

MR. BUDD. In burning off the foliage would it hurt the plant next year! It would have to be done early while it was green.

PROF. HALSTED. All of these remedies are more or less expensive. You have to steer between two rocks. Whether it costs more than it comes to I cannot say. It seems to me when a field is brown in September it has passed the period when it can do any work. It has then matured spores by the millions. If you burn them off you are probably killing off many of those millions of germs. It is possible you may do a little injury down near the surface of the ground.

MR. P. CREELY. This year the market was overstocked with asparagus.

MR. E. ROBERTS. It seems that although it was discovered in California fifteen years ago, it disappeared of its own will and accord. Probably it will leave us the same.

PROF. HALSTED. I have serious doubts of it ever appearing in California. Of course we will never know. There are several other kinds. Dr. Harper, of California, found his I think in the springtime. There are many kinds of black mould and fungus that look very much like this asparagus rust and it is possible that it was not this rust at all. I say it is strange that it has not been found there since, because there are quite a number of expert cultivators along this line in California.

MR. ROGERS. Where did it come from?

PROF. HALSTED. I do not know. It is known and laid down in the books in Europe, but it has never been so prolific there as it has been with us. They have never had it in a form that has been alarming. It may have come across the water. It may have come across as stowaway ballast or cash freight and then got into our country that way.

PEAR BLIGHT.

The following statements are drawn largely from the published reports of Mr. M. B. Waite, assistant in the division of Vegetable Physiology and Pathology, U. S. Department of Agriculture.

Pear blight is a contagious bacterial disease of the pear and allied fruit trees, caused by a very minute microbe discovered by Prof. T. J. Burrell in 1879, and known to science as *Bacillus amylovorus*. That this germ causes the disease is shown (1) by the immense number of the microbes in the freshly injured twigs; (2) that they can be taken from an affected tree and cultivated elsewhere and kept pure for months; (3) by inoculating a healthy tree with those pure germs the disease is pro-

duced and (4) the microbes are again found in abundance in the diseased inoculated tree.

"Blight first appears in the spring upon the blossoms. About the time the tree is going out of blossom certain flower clusters turn black and dry up as if killed by frost. The blight spreads with great rapidity at blossom time, due to the fact that the germs multiply in the nectar of the blossoms and are carried from one flower to another by bees and other insects which visit the blooms for the honey and pollen." If a few early blossoms are infected the insects will scatter the disease from tree to tree until it becomes an epidemic in the orchard. From the blossom the disease may extend downward into the branches or run in from the lateral fruit spurs, so as to do a large amount of damage by girdling the limbs.

The blight germs also enter through the tips of growing branches and in the nursery this is the usual mode of infection. This form is called twig blight to distinguish it from blossom blight, but the two are similar results from different modes of attack of the same disease.

Under conditions affecting the disease it may be stated in a general way that the trees most severely injured by blight are those which are healthy, vigorous, well cultivated and well fed. Warm and moist weather, with frequent showers, favor the disease; while dry, cool, sunny weather hinders it, and very dry weather checks it quite completely. With all its power for evil the microbe is a delicate organism, and soon perishes when not favorably situated for growth. Even when in the cambium layer, where the vital juices abound and are well protected, the germs frequently die out. This failure of the disease to continue is recognized in the sharp line between the living and the dead bark.

Mr. Waite has abandoned the idea that the pear blight germs pass the winter in the soil, and is convinced that they remain alive in those regions of the tree where the blight was active at the close of the growing season. "The germs keep

alive along the advancing margin of the blighted area and although their development is very slow it is continuous."

In spring when the trees are full of sap the microbes that have outlived the winter start anew and renew their work. Next comes the new growth and the blossoms and the gum that exudes from the blighted twigs attracts the insects, and the germs are carried to the blossoms and to the tips of shoots unfolding their tender leaves. The key to the situation seems to be in the active winter blight, and if it could all be destroyed there would be an end to the trouble.

MR. BEEBE. I would like to ask what benefit, if any, we derive from splitting the bark. When these little patches come on the side of the trees, by peeling it off we find some good sapwood and by splitting this outside bark we have sometimes stopped the spread of the blight in the trees. I would like to know what effect you think that would have and if I have really done the tree any good and why that patch comes in that way when right next to it, it will be all right. On one side of the tree there might not be any disease at all. It is evident that it either spreads all the way around or goes up and down.

PROF. HALSTED. Where the blight spot is found is due to the drying up of the substance of the bark, which is due to bacteria, and the cells being broken down there is a natural shrinkage and if that spot has committed suicide then there is a sharp line between the dead and the living, but if they are still active you do not find demarkation so strong. Anything that opens this natural barrier, which a plant puts on for its own protection, is apt to let something in that will be of harm to it. You know more, probably, about the care of trees than I do.

MR. FULLER. I know that my father used to make an incision on cherry trees. They were killed sometimes. He

would get up a spiral circulation and treat them by that operation from the root up to the first branches of the tree. Why would not that be of some assistance to the pear tree? I saw an orchard of Bartlett pear trees entirely killed by this blight. Now I think if a spiral circulation could be got up it might affect it. I know it did in the case of cherry trees.

MR. MILLER. What varieties are the least subject to blight?

PROF. HALSTED. The Kieffer was thought for some years to be ironclad, but it afterward got this pear blight.

MR. BAIRD. The Secker is not so bad as some others.

PROF. HALSTED. Secker; Clapp's Favorite; I do not know any variety very free from it.

MR. FULLER. Is the Sickle as free from it as any?

MR. BAIRD. Yes.

PROF. HALSTED. If it gets in the neighborhood it is apt to attack every variety.

TREATMENT FOR PEAR BLIGHT.

There are two general methods of treatment for the pear blight. First, aim to put the tree in a condition to render it the least liable to attack. This means to so manure and cultivate that the tree will not grow rapidly. Thus the more a tree is fed the worse it will fare when attacked by the blight. Trees that are highly fertilized with nitrogenous manures are especially liable to blight. In short, over stimulation with manures is to be avoided. Good tillage in the same way, while it makes a tree bear, also tends to increase the susceptibility to blight. Anything that retards the growth is beneficial, so far as the disease is concerned. The orchardist must stimulate by manures, and cultivate sufficiently to give a good

crop, and shun that which will do more. Soil and situation will determine largely whether sod or cultivated may be best to resist the blight.

The second method is the extermination of the blight germs, which seems to be the only direct remedy. This is done by cutting out and burning all blighted portions of the trees. Every tree of the pome family, including the apple, pear, quince, crabs, mountain ash, service berry and hawthornes should be treated in the same manner. Particular attention should be paid to the active blight of late autumn, cutting it out and burning the branches before spring arrives. It is important to cut out the blight whenever seen, but all should be removed before the next growing season begins.

To put the treatment in small compass, all blight should be removed as soon as seen while the trees are growing. A thorough inspection needs to be made in the late fall, for any branches showing blight. After those are cut out a sharp outlook should be kept for the disease in the orchard the next spring.

In connection with pruning and burning, the trees should not be stimulated beyond what is required for a fair growth of wood and the production of a profitable crop.

PROF. HALSTED. I have here a photograph of the Hawthorne and also of apple blight. The apple blight is quite different from the old pear blight. These are seven months old plants.

EXPERIMENTS WITH PEACH ROOT GALLS.

There have been many complaints of the galls upon the roots of peach trees in the State, and some work has been done upon the subject during the past season. In the last annual report (1895) of the experiment station, pages 359 and 360, a brief mention was made of the trouble and an engraving showing two specimens of the peach root gall.

Peach pits originally southern grown were obtained from a nurseryman in the State and the seeds, then beginning to germinate, were planted in the greenhouse upon the fifteenth of February. In one set of six large pots sand was used and in a second parallel set common greenhouse earth was used. Into two pots of each set raspberry galls were added, after having been cut up into small pieces; two received minced peach galls and one received nothing. One of the two pots receiving the raspberry galls and the peach galls, respectively, had sulphur added at the rate of one pound to four hundred of soil.

The seedlings were thinned out from time to time and the whole removed from the pots upon September 17, after a period of seven months.

It was found that pots, both sand and soil, in which the inoculation had been with minced peach knots were much more diseased than elsewhere. There were some galls upon all the plants; but the least where no peach virus had been used. There was no difference between the check pots and the ones receiving the minced raspberry galls. The sulphur showed unmistakable power for retarding the development of the galls. The soil pots showed a much larger development of the galls than those containing sand.

A considerable space on a bench was devoted to a duplicate of the above tests. In this instance the seedlings were grown in rows and the minced raspberry and peach galls added to the soil in the rows before the seeds were dropped. In like manner the sulphur was added in the open row. Two sets of experiments were made, separated by three weeks of time, but all harvested upon the same day (September 17) as the pots above mentioned.

The results in the soil upon the bench were in all respects parallel with those in the pots, and point to the conclusion that the peach root gall is decidedly contagious, and with the seedlings surrounded with minced peach galls the affection is

almost certain to appear and in a violent form. Upon the other hand the experiments do not indicate that the raspberry root galls, when treated in the same manner as the minced peach galls, have any power to induce the formation of knots upon the peach. All of the experiments show that sulphur may be looked to as a remedy for the trouble.

A nurseryman was interested in the subject under investigation and kindly followed out a plan that was submitted for trial. A portion of his peach pits were treated to sulphur, one part to 250 of the soil, and another with one part of lime to 500 of the soil. A belt of several rows in the nursery was planted with the sulphured seedlings and another to those receiving lime. This field was visited by the writer twice during the growing season and at both times the rows receiving the sulphur were easily distinguished by their larger size and greater vigor. At the close of the second season these plants will be thoroughly examined and results may be expected. So far as the test has gone the owner expresses satisfaction with the treatment of peach seedlings with sulphur as a remedy for the peach root galls.

MR. BAIRD. Do I understand that it developed in the soil what it did not in the sand?

PROF. HALSTED. There was less development of the peach root gall when the seedling was planted in sand than in ordinary greenhouse dirt.

MR. BAIRD. Did you find that the gall developed on the root in every case?

PROF. HALSTED. In the earth it did.

MR. MILLER. Did they all show gall where they were not inoculated?

PROF. HALSTED. Where they were planted in earth and no sulphur used they all had the gall; no more than ten per cent. did where sand was used.

MR. BAIRD. Do you know under what conditions those pits were wintered? .

PROF. HALSTED. I know something about it.

MR. BAIRD. The idea I want to get at is whether peach pits, which were in soil that was charged with raspberry gall, would develop it on the root when planted?

MR. BLACK. The pits were all bedded in pure sand and never came in contact with any other seed.

MR. BAIRD. Could the peach pit be treated to sulphur so as to destroy any of that gall before it was planted?

PROF. HALSTED. I do not know. The treatment was only in the bed. Here is where we get that information.

MR. BAIRD. It would be very much easier to treat the seed than to treat the plant.

PROF. HALSTED. I want to do something of that kind this coming year. I see just how your minds lean, that those pits have the gall before they are planted.

MR. BAIRD. What I want to get at is to prevent the development of it in the seed. Can I treat the seed before it is put in the rows? Am I to scatter sulphur in the row or on the pits? I want to know which is the better. The easiest way of course is the better.

PROF. HALSTED. My opinion is that the cheapest way is to treat with sulphur in the bed where you treat the pit.

MR. BAIRD. The pit is covered with this hard shell. Is there any need of putting the sulphur there? That would

not affect the pit. We can scatter sulphur over these beds as they are taken out, and that might accomplish the purpose.

MR. JONES. Do you mean the shell or the kernel?

MR. BAIRD. Kernel.

PROF. HALSTED. I think you ought to be careful in doing that and not use the full strength of the sulphur. You ought to mix the sulphur.

MR. BAIRD. With plaster?

PROF. HALSTED. With earth or anything. I think you would come here with very much to say against sulphur if you did not.

MR. MILLER. You were asked by Mr. Baird if it was not already in the pit. Do you know whether the pits from Virginia have any?

PROF. HALSTED. I would like to spend a month in that region next year and find out how they get these pits together. The pits may have been lying on the ground for a month or so.

MR. BLACK. I have had some experience in growing peaches and I think it would be hard to make me believe it is in the seed. You will plant 200 or 300 acres of peaches and in some portion of the nursery there will be acres and acres where you can't find any, and then occasionally you will find that it will form right up above the ground. If it is from the seed, why does it form there? It is only occasionally on a piece of ground that they are really bad. It seems to be worse on trees that have been forced. I am pretty well satisfied it is not in the seed because if it was it would be as apt to come in one place as in another.

PROF. HALSTED. I have in mind this: Get some pits from Tennessee, some from Georgia, some from California, some from Maine, and put them all in the same soil.

MR. BAIRD. You have a suspicion that the seed is inoculated?

PROF. HALSTED. I have suspicions of all kinds.

MR. BEEBE. My experience is that it is in old beds. A good many old nurserymen have beds where they bury their pits year after year. where they become so diseased with these galls, that you will find them more frequently there than any where else. From my individual experience I think it is in the soil and not in the pits. What you have said to-day led me to believe that it was in the pits. My own belief is that it is in the soil, because there will be peaches on our ground that will be entirely free from this and then you will strike a peach tree that is contiguous with the others where it is plentiful. Now if it came from the pit it would be general in the cultivation, therefore I have come to the conclusion that there is something lying in the soil.

MR. CREELY. I have always put the pits in a new place and planted the trees in a new place, and never have had one gall. We get our pits from Tennessee, gathered by those darkies that you have reference to and they have been all right. I think it is in the soil.

MR. BAIRD. You will find this gall on apple or pear. Is that the same thing?

PROF. HALSTED. It is.

MR. BLACK. I have always had the opinion that it was the same as the raspberry gall. Several years ago in our business we purchased a small seedling nursery, some two or three miles from our place. Some few rows were over a raspberry patch and that portion of it was badly damaged and we threw them right out. I sent away some specimens of the peach gall and the raspberry gall.

MR. KERR. Would you permit me to recite one instance? This root knot or gall is not grown from seed at all. It is grown from plums and it is worse on them than it is on peaches.

PROF. HALSTED. Does any one know whether the trees in Tennessee, from which you got your pits, had root galls or not?

A NEW FUNGICIDE.

During the past year experiments have been carried on with three new fungicides, Bordeaux mixture being used as a standard of comparison. The lime in the Bordeaux mixture is troublesome to many and an attempt has been made to replace it with another alkali soda. Potash and ammonia have been employed for this purpose, and in each case the mixture takes the hyphen-name of the Bordeaux and the alkali used, namely Soda-Bordeaux, when soda replaces the lime in the ordinary Bordeaux; Potash-Bordeaux, when potash is used, and Ammonia-Bordeaux, when ammonia is employed. In short, four compounds were used as fungicides, each carrying the same amount of copper, added in the form of copper sulphate. The Ammonia-Bordeaux is somewhat similar to an old fungicide known as *Eau celeste*, or the beautiful blue liquid called "heavenly water" by the druggists. The results obtained with this fungicide will be given in the annual report of the Experiment Station, and here it needs only to be stated that it is not a safe mixture to use, there being danger of the ammonia burning the foliage. The Soda-Bordeaux and the Potash-Bordeaux are quite similar in appearance and fungicidal properties, but the results have been somewhat in favor of the potash, and as the latter is a standard constituent of soil fertility it is to be preferred to the soda, which has but little value as a plant food.

The potash employed for the experiments was practically

pure and put up in twenty pound cans, costing about nine cents per pound. The hard mass is removed from the can by taking off the cover and inverting the can in a kettle holding three or four gallons of hot water. This becomes the stock solution of a potash that can be kept in large bottles or a demi-john securely corked.

With this pure form of potash the formula for the fungicide is

Copper sulphate,	1 pound.
Caustic potash,	$\frac{1}{3}$ -pound (about).
Water,	10 gallons.

It is found advantageous to make up the solutions of potash and of the sulphate of copper, each to one-fourth the full bulk of the mixture and pour the sulphate of copper into the potash solution, afterwards bringing the mixture to full dilution by adding an equal amount of water. Thus, if one hundred gallons of the fungicide are desired, pour twenty-five gallons of the sulphate of copper of the copper solution into twenty-five gallons of potash solution and afterwards add fifty gallons of water. When only small quantities are desired it is best to dilute fully before mixing.

This makes a mixture that has somewhat the color of the ordinary bordeaux, but without the lime and therefore there is no difficulty in the clogging of the nozzle of the sprayer, and much less bother in the making than when lime needs to be slaked and strained.

If a definite formula is not followed it is best to use a test for the mixture that there may not be an excess of copper sulphate upon the one side, or the potash upon the other. This can be done quickly by moistening litmus paper with the mixture, the blue slip of paper reddening if the acid of the copper sulphate is present, and the red slip turning blue when the alkali (potash) is in excess. After this test is once made for a stock of both the copper sulphate and the potash, careful

measurements will be sufficient to maintain the neutral point for the mixture.

While there is no danger from burning when the mixture varies somewhat from the neutral line there is a disadvantage in having it slightly acid, because it settles more rapidly, while on the other hand, if the potash is in excess, the mixture after a time will turn brown, and shows upon the foliage, but even then much less than the ordinary bordeaux.

These fungicides were used upon several crops, but the most thorough test was made with beets. The annual report of the Experiment Station will contain a full account of the result with each crop, and only those with beets will be detailed here.

PLOT.	TOPS.	ROOTS.	TOTAL	
1 Soda-Bordeaux,	240.5	1135	1375.5	
2 Check,	175	987.5	1162.5	
3 Bordeaux (Lime),	348	1640	1988	
4 Potash-Bordeaux,	388	1849	2237	
5 Check,	217.5	1253.5	1471	
6 Am'onia-Bord'ux,	278.5	1078	1356.5	
Average of two checks,		1316.7		
			FOLIAGE.	ROOTS.
	Bordeaux,	1988 gain	77	46.5
	Potash-Bordeaux,	2237 "	97.5	65

One-fifth of an acre devoted to beets in 1896 had been a part of a field upon which two successive crops of Mangle Wurzels had been grown in 1894 and 1895. The same variety, Colossal long red, was sown again the present season. The primary experiment in connection with this crop consisted in spraying the foliage with the four fungicides to prevent the development of the common beet leaf blight, *Cercospora beticola* Sacc. This fungus materially injured the two preceding crops and its reappearance could be expected with some degree of certainty.

The field was divided into six plots, the first of which was

sprayed with Soda-Bordeaux, while the second was untreated. Plots III. and IV. were sprayed with Bordeaux and Potash-Bordeaux, respectively; while V. was untreated and to VI. was applied the Ammonia-Bordeaux. The date of the first spraying was June 6, when the beet seedlings were about one month old, and the crop was sprayed twelve times, the last application being made September 14. The intervals between sprayings ranged from six to fourteen days, and time varying according to the amount of rainfall.

Heavy and frequent rains with high temperatures prevailing during June and July, were favorable for the development of the leaf spot. At the same time the above conditions became a thorough test of the fungicidal properties of the several solutions employed, the efficiency of which must have been materially diminished by the washing of the rains. Little or no blighting was observed during the first four or five weeks after the appearance of the young plants, but from that time, however, the characteristic discolorations began to be noticeable, and the disease made rapid headway outside of the sprayed belts, which continued comparatively uninfested. By July 1 there was a decided contrast between sprayed and unsprayed plots, and the difference became more pronounced during the following ten or twelve weeks, that is, up to the first of September. Only a few leaves were much injured upon the sprayed plants; whereas those of the unsprayed plants were reduced for the most part to the more recently developed leaves, the older ones hanging down shrivelled and lifeless. A second form of blight (*Phyllosticta* Sp.) was occasionally observed during the months of June and July, but later in the season it seemed to have wholly disappeared. Ammonia-Bordeaux, unlike the other three solutions employed, proved unsatisfactory on account of its caustic action upon the foliage. It was seen after the first spraying that the leaves to which it was applied were burned, but a modification of the formula made the later application less objectionable.

Had the crop been harvested during the latter part of August, it is quite probable that the difference in weights between the sprayed belts and checks might have been greater than was the case a month or so later. To the eye at least the contrast at the earlier date was a most striking one; even the plot sprayed with Aminonia-Bordeaux seemed to contain a greater quantity of foliage than did its adjoining check. In September the plants grew much more rapidly than during any of the preceding warmer months, while the development of the blight seemed to be materially retarded. By October, therefore, the check plots presented a considerably better appearance than a few weeks previous.

The land inclined gradually and the soil increased in fertility from the upper side (Plot I.) to the lowermost plot. To this must be attributed much of the variation in the product of the first three sprayed plots.

The weights of foliage and roots produced upon the several plots show that Plot I., sprayed with Soda-Bordeaux, when compared with its adjoining check gives an increase in the amount of foliage of 37.5 per cent. and in roots of 15 per cent. Here the sprayed plot occupied somewhat poorer soil than did the unsprayed.

Plot III., sprayed with Bordeaux, compared with the same check, shows an increase of 98 per cent. and in the amount of roots of 66 per cent. In this instance the advantage in soil fertility is somewhat in favor of the sprayed plot, but when it is compared with the second check, Plot V., the reverse is true. The difference in yield although less than with the first check is yet decidedly in favor of the lime plot; the amount of foliage being greater by 60.5 per cent., with an increase in roots of 31 per cent. Compared with the average of the two checks the Bordeaux plot shows an increase of 77.5 per cent. in amount of foliage and 46.5 per cent in roots.

Still more favorable results followed the application of Potash-Bordeaux in Plot IV. Here the increase in foliage

over the adjoining check, Plot V., was in foliage 78.5 per cent. and in roots 47.5 per cent. The difference as to soil fertility was in favor of the check. Compared with the yield in the first check the per cent. of increase is considerably greater than in the case of the Bordeaux plot. The weight of foliage was double that of the check, 121.5 per cent., while the roots showed an increase of 87 per cent. The gain of the potash belt over the average of the two checks was, for foliage 97.5 per cent. and for roots 65 per cent.

In Plot VI., sprayed with Ammonia-Bordeaux, there was a gain in foliage, over the adjoining check, of 28.5 per cent., but the weight of roots was less by 14 per cent.

As already stated, this plot occupied the most fertile soil in the series, but owing to the foliage having been greatly injured by the burning of the fungicide, it was only to be expected that the product would be much below the normal. That the injury was due to the fungicide rather than to the fungus was apparent, since the spotting due to the latter cause was not sufficient to produce any appreciable harm.

On motion of Mr. Baird a vote of thanks was tendered Prof. Halsted for his interesting and instructive address.

THE CHAIRMAN. We have a little box here called the question box. If any one wishes any questions answered please drop them in this box and sometime during the session they will be answered.

LOCATION AND EXPOSURE OF ORCHARDS.

BY MR. EMMOR ROBERTS.

I will not take much time because I think I have little to say. In regard to the location of orchards, it appears to me, in the first place, you want a dry piece of soil over a good dry sub-soil. It has always been considered that a

western slope is preferable. The main thing, which is quite as important, is to locate on property of somebody who takes care of it afterward, somebody with plenty of industry, perseverance, patience and pluck. You will need them all and liberality. I think this a very good thing. If you can get a northern exposure I think it is preferable. The worse exposure an orchard can have is exposure to neglect; that is very common and very fatal. From the earliest history we have, the typical idea of a home is where a man could sit under his own vine and fig tree. That is my idea of a home yet. I think that in every rural or suburban home, where you have half an acre, there should be a place to locate an orchard. Near every country household there should be some fruit trees, at least some cherry trees, and possibly some plums and a few grapes. With high ground or low ground take your chances. Whoever does the best he can acts nobly, and I believe that contiguous to every home there should be an orchard, even though it be very small. I think I have nothing more to say. If anybody has any question to ask, I will answer it.

MR. BEEBE. How do you define an orchard for commercial purposes?

MR. ROBERTS. For commercial purposes take as much as you can manage. For a home orchard you want two or three cherry trees, half a dozen apple trees, a few early peaches and a few late ones, Bartlett and Lawrence pears. That is what I call an orchard for every little home, and I think it is essential to have it.

PROF. HALSTED. What do you think of having orchards in grass sod?

MR. ROBERTS. I prefer every tree under cultivation.

MR. MILLER. As to liability to blight, would you set grafted trees, or graft after the trees had made good growth where they are to remain?

MR. ROBERTS. I take no stock in this grafting for orchards. Neither do I believe that grafting is a protection from blight. The trees blight just as bad where they are grafted as where they are not.

MR. BEANS. What apples would you cultivate?

MR. ROBERTS. There is any quantity of good apples. I would plant William's Early Red, Hagloe, Gravenstein. I would plant real apples, big apples.

MR. MILLER. Would you plant Ben Davis?

MR. ROBERTS. Yes, I would plant Ben Davis. I brought some here this morning that were grown on our ground. They remind me a little of the minister who preached a sermon and asked a man how he liked it. "Well," he said, "you have some pretty bad faults." The minister says, "What are they?" "Well," the man said, "you read it; in the next place you did not read it well, and after that it was not worth reading." That is the way with these apples. They have been poor growers; on heavy soil they have been very unsatisfactory and when we have them they have been poor, but with all their faults they sell first rate. They are a great deal like that minister's sermon to me. In one orchard the trees have been out about fifteen years. They are the smallest trees in the orchard and have borne me less apples and net less money than any trees in that orchard. This is the Delaware Red Winter or Lawver. We know very little about them. These are from an orchard that came into possession of my son last spring. The man that was there before him said they went ahead of any apples he ever saw. They sometimes grow two or three times as large as these. Here is another, the Mann apple. They grow pretty well and bear pretty well. I can manage a couple of them every evening very satisfactorily. They are an excellent apple to grow and good to eat. The Ben Davis is a flat apple, but it is a pretty good apple.

MR. PARRY. How about Duchess of Oldenburgh?

MR. ROBERTS. In the first place the tree is not a very hardy one. Does not bear very many apples.

MR. BURNETT. How about the Northern Spy?

MR. ROBERTS. I would leave that out.

MR. GOBEL. Shy bearers.

MR. BAIRD. They are not so shy but they rot on the tree.

MR. FARMER. For Northern New York they are a good apple.

MR. BAIRD. I am speaking of Southern New Jersey.

MR. ROBERTS. Cooper's Market is a nice apple. When I was a small boy about sixty years ago they were very nice apples. I have been familiar with them ever since. I don't know why we stopped raising them.

MR. HALE. Are they shy bearers?

MR. ROBERTS. No, sir. I have grown up with them from my childhood.

MR. BLACKWELL. Perhaps you do not like to plow under the trees?

MR. ROBERTS. They have a drooping habit, that is so.

MR. KERR. English Codlin is a pretty good apple if you are hungry, but they are not a very good market apple.

MR. BAIRD. Our English Codlins are not fit to eat.

MR. BLACK. The Keswick Codlin is an upright grower but the English Codlin is crooked. At the same time the English Codlin is a good eating apple at our place but that is all it is fit for.

MR. ROBERTS. The Early French Reinette of Coxé is a good apple. The only one that is absolutely satisfactory to us. We had an elegant crop which sold well.

MR. BEANS. Some call it the Princess Early. Summer Rose is better.

MR. BAIRD. How about Cornell's Fancy?

MR. ROBERTS. Cornell's Fancy is a fancy apple, nice foliage, beautiful grower, red, large, nice to eat, splendid to sell. It is just one of the finest trees you have before the tree dies, as it comes to maturity early nearly every time. You look at it one day and it is fine and then you come back again and you find your tree is gone. To my disgust a year or two ago my son set out sixteen more of them. He knew their weakness, but he knew their good qualities and took chances on them. The Newtown Pippin is past its day and most of the trees are gone. I have half a dozen trees which I set out in my orchard in my early life, and they have done very nicely by giving them plenty of Bordeaux mixture.

MR. MILLER. Do they drop their fruit?

MR. ROBERTS. The principal fault they have they will drop their fruit, but by treatment you can prevent that. The Lady apple we have raised but have never made much of it. It is a little apple. The trees are not first class growers but pretty good.

MR. MILLER. Is Newtown Pippin one of the most profitable?

MR. ROBERTS. No, we have not the market for it. If we had it would be one of the most profitable. If we had 500 trees of them it would be profitable, but if you have but half a dozen trees you have not enough to make a market for. Ben Davis is an apple that will outsell the Newtown Pippin every time. Snow apple is an elegant apple.

We have only two trees bearing. They ripen with us almost too soon. They are very good to eat. They are very fine in New York State. The Williams' apple is an excellent large red apple for cooking. It is a good apple to eat, to bear and to grow. We commence to market it about middle of July.

MR. BAIRD. The Yellow Transparent is a very good apple. You have to be a little bit more careful of them than eggs.

MR. HALE. The cedar trees make that yellow underneath (referring to rust).

MR. BAIRD. No; we banished the cedar trees.

MR. HALE. Do they have the same rust?

MR. BAIRD. Yes, sir.

MR. BEANS. Plum Cider is a nice apple. It is a nice strong grower and a good apple, and I believe it is a profitable one.

MR. BAIRD. Will you please name six apples which you would plant for your choice in a commercial orchard?

MR. ROBERTS. I would take Williams. I think I would take the Hagloe. If you want one to ripen just after them, I would get the Gravensteine, then the Plum Cider, Ben Davis and the Baldwin.

MR. BAIRD. Did you decide as to the Baldwin?

MR. ROBERTS. Yes, I would take the Baldwin because it is a better apple to sell and a better apple to eat than a great many others. The York Imperial is good to sell but not so good to eat.

MR. BAIRD. I think I would rather have the York Imperial.

MR. ROBERTS. A few years ago I condemned the Baldwin; but after taking pretty good care of them and spraying them well they got to doing first rate, and since they have done well enough.

MR. FULLER. Are there two kinds of Baldwins?

MR. ROBERTS. I do not know. In one place they are a deep dark red, in another place a moderate red.

MR. MILLER. There is nothing grown better for a winter apple than the Baldwin.

MR. BLACK. In my opinion the Baldwin is one of the most unsatisfactory apples you can plant. It is neither a fall nor winter apple.

MR. BLACKWELL. I have never raised finer apples than the Nero.

MR. BLACK. There is no apple that will give better satisfaction when it is young.

MR. ROBERTS. I have used them enough to know whether they are good for cooking. I have not been in active communication with the farm for about eight years. The trees are about fifteen years old and they have not borne to meet my expectations. The Delaware Red is very much the same style. They do very well to eat out of the hand and do very well to sell.

MR. MILLER. I have a considerable number of trees of practically worthless varieties, probably twenty-five or thirty years of age. They are very vigorous and perfectly healthy. Would you deem it possible to successfully top graft those trees?

MR. ROBERTS. I should think so.

MR. BLACK. I believe I would rather take a new plantation than to graft them. The grafted ones come a great deal sooner but they die off quicker.

MR. MILLER. I noticed an article in a paper some time ago to the effect that it could be done with such large trees by taking limbs of six inches in diameter.

MR. BLACK. I have done that; just cut them off and split the bark on the edge, and they will grow very nicely and a great many of them will grow out, but I really and honestly think it would be better to plant a new orchard.

MR. BLACKWELL. I will have to stand up a little bit for that Nero apple. It is certainly one of the best if you will plant it and spray it.

PLUMS AND THEIR IMPROVEMENT.

BY J. W. KERR, DENTON, MARYLAND.

The impressions and observations as recorded in this paper. concern chiefly plums of our native species, together with a brief review of the triflora group. Though emanating from the narrow plane of individuality, they are nevertheless the plain facts, reflected by the negatives from the unpretentious camera of experience, or personal contact with the trees and fruit.

The extreme tension to which the lines of competition have been drawn, in every avenue of trade—fruit growing included—has served American pomology a good turn, by almost forcing attention to the improvement of the several groups of this fruit. No other branch of our diversified pomology has presented opportunities so readily accessible, or more replete with possibilities of gratifying and profitable achievement as has the improvement of our native plums. The neglect for *so* long to utilize and turn to industrial

account the valuable properties of native species of plums, would indicate that American pomology has been content to march in the rear of other arts and industries, or that the declaration of American independence has not yet been fully ratified and accepted by that intelligent class of Americans who pay homage to fair Pomona. The sluggish shadows of prejudice, that for so long have blinded us to the real merits of the several species, are at last dissolving in the x-rays of progress. Nature herself years ago manifested an affectionate impatience at our negligence in this field and presented us, in rather a suggestive way, the variety widely known as the Wild Goose plum. When this variety was first disseminated, away back in the "fifties," such a thing as self-sterile blossoms on fruit trees was simply regarded as an illusion of sensible perception, with the "rank and file" of fruit growers; in consequence of which a score of years flitted by before the merits of the variety were appreciated. The knotty problem that was puzzling the brains of plum growers of that day, was a feasible plan for the extermination of that "pocket edition" of the Sick-man-of-the-East," familiarly known as the "*Little Turk*." In 1872 a letter from a friend at Dayton, Ohio, contained the astounding information that he had sold his Wild Goose plums in Cincinnati for \$11 per bushel, and advised me to plant my entire farm with this variety. The writer of the letter was engaged in the nursery business, hence I salted his friendly counsel pretty well by compromising on half a dozen trees each of the only four varieties of native plums that I had yet seen catalogued, viz., Wild Goose, Miner, Newman and Moreman, and some of those trees are still vigorous and healthy, bearing good crops annually. In 1877, from one single tree of Wild Goose, the net returns were \$21.14. Subsequent to this I received a great many reports of the utter worthlessness of the Wild Goose variety. "They bloom abundantly but are invariably frozen and drop off," was the burden of complaints written me by planters. Testimony adduced by the search-light of botanical science,

reveals something of a biological discord in the elementary and organical construction of the blossoms of most if not all the varieties; a condition that seemingly is intensified and extended by the stimulating influences of cultivation, or the higher standard of pomological civilization.

The localities are so few, and so restricted in area, in which plums of the domestica group can be successfully and profitably grown, while the species as a whole, is heir to so many ills prejudicial to the peace and propagation of that high standard of Christian conduct, so universal among fruit growers, as to render the group absolutely ineligible as a dependence from which to draw the supplies demanded by our markets. The well-founded claims for superior *quality* of the fruit itself are wholly barren of results, in popularizing it with the masses who buy, to the disadvantage of that of our native species, but the incontrovertible truth is the great tide of favoritism that controls consumers seems to have taken a strong set in the opposite direction. During the last five years I have sold the larger varieties of the natives at prices ranging from thirty-five cents to sixty-five cents for a ten pound basket, when the larger, and *finer*—if you prefer it that way—Domesticas from New York State, *begged* customers at fifteen cents per basket of same size. Such is the situation relatively in Baltimore. In the St. Louis market the past season, when large Green Gages and other domesticas would not sell at *any* price, the bright colored natives moved right along in tremendous quantities. These are practical and significant facts, each bearing the headlight of a "revenue cutter," and the superannuated sentiment as to quality, has only left its own chestnut flavor to support and commend it to those who grow plums or *other* fruits for a livelihood. Some intelligent growers in the Western States believe some of the varieties, especially in the Americana group, to be reliably self-fertile. A few years back I was of the same opinion, but carefully conducted tests lead me to doubt the reliability in

that relation of any and all varieties in my collection, embracing more than two hundred kinds. Possibly, locality may have some unfavorable influence in this respect, but I would not plant any variety isolated from others, such as would afford assurance of ample pollination.

The pollination of blossoms in an economical sense is a subject that the cycles of time and progress of fruit growing are pressing upon the attention of horticulturists, in a way forcefully suggestive of its intimate connection with the profit and loss account of their business. Results of competent investigations testify to conditions involving uncertainty in this regard with many varieties of pears, cherries and even apples; but in no other branch of fruit culture are the laws of pollination so confused or more exacting than in the cultivation of our native plums. To this fact, more than to any other, are we indebted to-day for the light of that scientific investigation has given us, concerning what appears to me, a deterioration in the normal functions of the flower organs, caused by an increasing under our modern methods of culture.

The fact that such varieties as Milton, Whitaker *et. al.*, do not pollenize their own blossoms, is not because their blossoms are barren of pollen, but because the same laws that govern animal life in this particular, control as absolutely in the vegetable kingdom. If the pollen is not ripe or ready for application, when the stigma is in condition to receive it, pollination fails. Hence, an ample supply of pollen of proper affinity, throughout the blooming season, is indispensable to a full measure of success. This difficulty, irregularity, defect, or whatever you may prefer to call it, is readily overcome, by alternating varieties of different groups when planting. Of course careful regard must be exercised in such selections, choosing varieties that bloom at the same time. To obtain best results, selection should go still farther, and only the kinds yielding the largest and finest fruit, best adapted to the purpose for which it is intended, should be chosen. It has been clearly and satisfac-

torily demonstrated that the influence of fecundating pollen does not terminate until the fruit is fully developed and matured, which constitutes it largely a governing factor as to size, and, in a less marked degree, form and color. Grant compliance with these common-sense conditions, and an orchard of native plums, can be planted in any locality in your State, on any soil where a prudent man would plant peaches, with competent assurance of two crops of the former to one of the latter in a series of twenty years. They are hardier in both tree and blossom and will withstand the strain on constitutional vigor and vitality, incident to annual fruit production, with as much impunity as a well-cared-for gooseberry bush. This declaration is based on an experience of twenty years. Whilst improvement in the fruit of the more prominent species is making very gratifying progress, there is great need of a better "stock" upon which to propagate the trees than is afforded by the Marianna, which is simply a variety of the old Myrobalan with all its faults. The greatest merit of the Marianna as a stock is its freedom from root suckers or sprouts; its popularity results from the easy manner by which stocks of it can be propagated from cuttings in localities favorable for such methods.

In some sections on the Pacific coast these "stocks" are attacked with what is there called sap-souring, a kind of apparent fermentation that begins at the union of the tree and stock and kills the trees thus affected. Through the South they have root-knot, which affects injuriously the root systems of the trees both in nursery and orchard. The sap-souring, as described by California nurserymen, is yet unknown on the Chesapeake peninsula, while we do have an occasional tree with root-knot; but there is another and more serious objection to this stock where budding is resorted to as the means for propagation. There apparently develops some uncongeniality at the union, and quite a good many orchard trees of different varieties of both natives and Japans fail at this

point, the bark of the stock binding or lacing until it dries and deadens. This occurs with trees healthy in all respects.

When peach is budded upon Marianna stocks the same trouble occurs. For several years I have been experimenting with the hope of finding a stock more generally congenial and suitable for the native species than the Marianna. Seedlings of the Golden Beauty and Wayland give encouraging promise of meeting this want with me. These are both varieties of the Hortulana group, are vigorous growers with abundant, healthy foliage, and the roots are content to attend strictly to their legitimate business. The finest and most satisfactory bearing trees in my orchards are on Golden Beauty stocks. No instance of lacing at the union has yet occurred with the stocks of either Golden Beauty or Wayland. Satisfactory stocks grown from seed are decidedly preferable to those grown from cuttings, with practical and thoughtful propagators, for reasons that are obvious. Twenty-five years back, plums of our native species had no place in nursery catalogues, except in a few isolated instances in the South; then the list did not exceed half a dozen kinds, while to-day there are more than three hundred varieties of the different species under cultivation, and the end is not—yet.

For the Middle Atlantic and Middle Western States the Hortulana group ranks first in importance. The improvement in this group has provided a list of varieties ripening—in my locality—from last of June to beginning of September, most of which are profitable market kinds, enough so to impart the prime and enduring incentive to labor and capital, which is accepted as “a good interest on investment.” Salable fruit, and plenty of it, is produced by any of the following list, viz. : Milton, Whitaker, Wild Goose, Choptank, Clifford, Chas. Downing, Col. Wilder, Smiley, Pool’s Pride, Roulette, Wooten, Prairie Flower, Maquoketa, Idall, Forest Rose and Crescent City. For family use, and as a complete substitute for the uncertain Damsons, in the home cuisine, the Reed, Moreman,

Wayland, Garfield and Kanawka, will, with fair and intelligent trial, be found entirely satisfactory.

The Americana group, too, seems to be overflowing with possibilities in the line of improvement and "Good will toward man." Among the newer introductions belonging to this species we find varieties, which for uniform large sized fruit, rival those of the Triflora or Japan group with attractive color and splendid carrying or shipping qualities, supplemented by great prolificacy and vigor of trees. He who speaks disparagingly of this group without knowing the orchard merits of such varieties as Ocheeda, Bixby, Miller, Marion, Meyer, Kieth, Smith, Gaylord, Stoddard and others, will 'ere long find himself breathing only the musty exhalations of fogysm—the Carbonic acid expelled from the rear end of the hindmost car of progress as the great train of improvement rolls uninterruptedly and triumphantly onward. The Chickasaws have not yet caught the pace of development set by the Hortulanas and Americanas. "New creations" in way of varieties seem to rest on some system of multiplication less ambitious. Neither does the short list of novelties belonging to this species display the marked advancement in commercial qualifications of the fruit so conspicuous in the others. Newman, one of the oldest varieties of the group, still maintains first place, with Lone Star and Munson close seconds. Was it not for that persistent and obstinate "color line," so potential and so despotic in our city markets, the Yellow Transparent would take high rank, but as its name implies, the fruit is yellow, a sin against popular favor for which no atonement can be made. As pollenizers for many of the most profitable varieties of the Hortulanas, the best varieties of Chickasaws are still esteemed as the main dependence.

The Mariana, or Myrobalan group, contains no varieties, so far as I am aware, that commend themselves to plum growers. All of its varieties, though wonderfully profuse in

bloom, with me are completely self-sterile. In the Maritima group, improvement has not progressed beyond the variety named Bassett's American, which is wholly devoid of merit as a market plum. The species *Pumila* (*Prunus Besseyi*) seems quite sensitive and responsive to the efforts of art, to amalgamate and confuse its idiosyncrasies with those of its superiors, as is evidenced by the success of Mr. C. W. H. Heideman, of Minnesota, in hybridizing it with the *Hortulana*, the results of which are a very manifest improvement in habits of the tree, as also fruit of larger size and much better quality. The "Improved Rocky Mountain Dwarf Cherry," recently advertised somewhat extensively, and which belongs to this group, is entirely valueless with me, in a market sense. A variety of this group, which originated on my own grounds several years ago, shows rather a wide departure from the dwarfish character of the species. The original tree is now twelve or fifteen feet in height, bears fruit double the size of the parent, with little, if any, improvement in its quality. The variety has been named Maryland, and is only mentioned suggestively, for the benefit of any chance hearer who may entertain inclinations toward improvement of the species. The foregoing embraces all the native species, the improvement of which has advanced far enough to arouse any interest. The domestica or European species, with me, is simply a full grown failure. That old adage, "The bird that can, but *will* not, should be made to sing," has an inner significance, in addition to which it would mean to the fruit grower who undertook to apply it to an orchard of this species of plums, the appointment of a trustee to pay off his creditors with his unjustifiable folly, consisting of bug remedies, fungicides and worn out sprayers.

The ill-matched struggle between success and failure, so long continued by growers with this species, prepared the way for the introduction of the *Triflora* or Japan group, which swept the entire domain of American fruit growing in a blaze of interest. Discrimination as to merit, which is only possible

through the tedious conservatism of trial, has about completed estimates of the varieties of the earlier arrivals. My own experience would lead me to discard all except Yosebe, Red June, Abundance, Berckmans, Marn and Chabot, if planting now for market. The others that I have tried are debarred from the list of profitable varieties by defects more or less serious, either as to the fruit itself or as to habits of tree. In 1895 the crop was abundant and fine as to size, smooth and handsome generally. The first good picking of Ogon was severely culled. Fifty-six ten-pound baskets of the very choice were packed with much care and consigned to a New York dealer in fancy fruits. I thought they looked tempting, large, smooth and though yellow, I felt that they ought to command a good price. Three or four days subsequently, received a letter from the firm inquiring as to what they should do with them, as they could not get an offer for them that would pay the freight. A smaller grade shipped at same time to Baltimore, netted a trifle over one cent per quart. The red varieties were also graded, the "selects" placed in half-gallon baskets, which when properly filled for shipping held three quarts. Eight of these baskets were fitted into carriers and sold the season through, from Abundance to the end of Chabot, at \$1.25 to \$1.75 per carrier, netting between four and five cents per quart, scarcely as much as fruit of the natives netted without any culling.

In explanation of my reasons for discarding some of the other varieties that have been lavishly praised in other localities, I am guided solely by unprejudiced experience. First, there is the Willard for example. You are all familiar with the extravagant claims made for it, especially as to earliness. It ripens precisely with Engre on my grounds, is no larger, no better, and rots so easily and badly as to disqualify it as a profitable variety. The Burbank, too, is an easy prey to the same fruit rotting fungus, and thinning the fruit fails to correct the evil. Berger, Long Fruit and Uchi Beni are too small.

Georgeson, Normand and Kerr, like Ogon, are yellow, while Bailey and Yellow Japan are quite similar in fruit and season to Chabot. The Botonkio is invariably killed in blossom, as it, like the Bon journe apricot, which it resembles in appearance of tree, blooms too very early for my locality. Kelsey too blooms so early as to jeopardize fruit production. Satsuma is unproductive, unattractive and unprofitable. Many other kinds of more recent introduction are on trial before the great jury of fruit growers, the merit of which will accurately gauge their merits in due time.

This group affords conspicuous contrast with the domestica in the healthy, handsome foliage and characteristics of its trees. It promises gratifying results to the patient, painstaking labor of crossing and hybridizing its best varieties with some of the finest and most profitable market varieties of our native species. Some work in this direction has already been accomplished and is rapidly becoming public, "for better or for worse," while a vast amount in an unfinished state is yet progressing. Any one interested in plum culture can not help being deeply impressed with the importance attaching to a careful and comprehensive knowledge of the habits and general features of both tree and fruit of the varieties selected, by and through which improvements of any kind, are to be effected by crossing. For whether or not the deeply obscure impress of ante-diluvian cultural attainments holds place in the dormant chords of nature, and like the injured key in a musical instrument, only awaits proper adjustment to again sound out and complete its pleasing harmony. The defiant fact still confronts us that the great melody of nature, yields its sweetest and happiest strains, only to the fingers most artful and educated in manipulation of the key board.

MR. E. ROBERTS. What do you do with Golden Beauty plums?

MR. KERR. If you have a favorable season you can make

more out of it than with the Japan. You can preserve and can them.

MR. DECOU. How about the Normand ?

MR. KERR. It is a new one sent out by Normand.

MR. E. ROBERTS. What are the relative value of Milton, Newman and Wild Goose?

MR. KERR. I would take Newman if I was confined to one variety. I think the Milton is more valuable than the Wild Goose. It is just as good to bear and about a week earlier.

MR. PARRY. The Newman, Wild Goose and Minor, do they all bloom about the same time ?

MR. KERR. No, quite a number of the Wild Goose blossoms will be gone by the time the others come out. Prof. Hale says the period during which pollination can occur is very short, often not over two or three hours.

MR. PARRY. Do the Newman and Wild Goose fertilize each other ?

MR. KERR. The Wild Goose will fertilize itself.

MR. PARRY. Will the Newman fertilize itself ?

MR. KERR. Yes, sir ; very well, and the Newman is a good fertilizer for the Minor.

MR. BAIRD. I move that the paper just read by Mr. Kerr be received and that he be tendered a vote of thanks.

MR. COLLINS. I would like to say it was an exceptionally interesting paper to me.

REPORT OF FRUIT COMMITTEE.

BY SAMUEL C. DeCOU, MOORESTOWN, N. J.

STRAWBERRIES.

The summer 1896 was exceedingly dry, so that most ground was but poor beds and some bore none at all, but where the ground was moist and the beds good, the returns were very satisfactory.

Bubach is the leading market variety for profit, owing to its large size and abundant yield.

Haverland is a better grower but smaller berry.

Gandy, of the newer kinds, ranks best as a late variety for market.

Marshall has a reputation of strong growth, fair yield, very large, handsome berries and good quality.

Brandywine is a mid-season berry resembling *Gandy* in general appearance.

Mary, *Glen Mary* and *Greenville*, pistillates, are all making good records and bid fair to hold position as standard varieties.

Saunders and *Tennessee* are both first class and good to raise to fertilize the pistillate varieties.

There are many other excellent varieties not mentioned that are perfectly safe to plant.

RASPBERRIES.

Cuthbert is a leading market berry.

Miller is new but bids fair to do well.

Louden is doing well, as far as tried, large size but rather late.

BLACKBERRIES.

Wilson is the leading market kind, early and productive.

Early Harvest is small in size, but owing to its extreme earliness often proves quite profitable.

Erie is quite hardy, of large size, generally, pays well.

CURRANTS.

Victoria Versailles, *Red Dutch*, *White Grape* and *Fays* are the leading profitable kinds.

Northern Star has not proven profitable for this section.

President Wilder, *Moore's Ruby* and *Prince Albert* are new kinds with decided merit and worthy of a fair trial.

GOOSEBERRIES.

Downing and *Houghton* are the leading market kinds, with *Downing* a little ahead for profit, owing to its large size.

Pearl does well, is large and prolific, not so thoroughly introduced as the former kinds.

Industry is one of the best foreign kinds, large and good quality, but for vigor cannot compare with our native sorts.

There are several novelties being introduced that it is well to mention. Conspicuous among these are the

Strawberry Raspberry, hardy, handsome grower and beautiful fruit, but the taste is disappointing.

Eleagnus Longipes, a thrifty growing shrub, bears a small berry of rather astringent taste.

Rocky Mt. Cherry.

Jap Wine-berry, strong grower, bears small bright red subacid berry.

Dwarf June-berries, a sort of huckleberry, not sufficiently fruited in this locality to report upon.

GRAPES.

The past season there was a fair crop of grapes of excellent quality. Some of the varieties to be recommended are

White: *Lady*, *Lady Washington*, *Pocklington*, *Moore's Diamond*, *Green Mountain* and *Niagara*.

Red: *Brighton*, *Salem* and *Wyoming*.

Black: *Concord, Moore's Early, Worden, Eaton and Cottage.*

Columbian is a new variety, just introduced, of very large size, purple color and over fair quality.

PLUMS.

Plums have been cultivated with varying success, from exceptionally heavy yields from an occasional tree to a large lot of stung and rotten fruit. And now comes the Japan and native sorts, that grow with great vigor and much of the fruit seems to outgrow the sting of the curculio.

Some very good reports have been made of the Japan varieties, then again the foliage has been defective and the blossoms blighted with the early frosts. But they have not been long enough before the public to establish their relative standing. Newman and Wild Goose are good native varieties.

PEACHES.

Peaches were a light crop and poor in quality. The varieties most desirable are Crawford's Late, Old Mixon, Mountain Rose and Stump the World.

PEARS.

There was a light crop of Kieffer, Le Conte, Garber and Smith's.

The Japan varieties seem to be crowding out other kinds. Less liable to blight, rapid growers, come quickly into bearing and often prove quite remunerative.

APPLES.

A very short crop and mostly of the early kinds. Very little to report of the late kinds. Some of the early valuable kinds are Williams' Early Red, Early Harvest, Maiden's Blush; of the late, Smith's Cider, York Imperial Ben Davis, Grimes' Golden and Nero.

CHERRIES.

A few orchards of the sour kinds did well, but the general crop was light and many trees an entire failure. Early Richmond, Montmorency and Dyehouse are good tart varieties. Black Eagle and Governor Wood are good sweet varieties and safe to plant.

NUTS.

The interest in nut growing is steadily increasing and gives promise of supplying from home grown trees the place of some of the nuts we have heretofore imported from foreign shores.

Grafting chestnuts is attended with some difficulty, but the same good results are to be obtained in that way as from grafting other fruits.

Japan Giant "Parry's," the largest chestnut known, ripening September 25.

Japan Mammoth "Pedigree," also produces nuts of immense size.

Japan improved varieties, given in order of ripening: Algotha, earliest, Sept. 5 to 10; Beta, Sept. 10 to 15; Early Reliance, Sept. 18 to 20; Success, Sept. 20 to 23; Parry's Superb.

Spanish Chestnuts: Numbo, nuts good quality, ripens early; Paragon, large and excellent quality; Ridgely, large.

On motion the report of the Fruit Committee was accepted and handed to the Executive Committee.

THE CHAIRMAN. As there are several questions in the box, I will now have them read.

Query 1. Is there danger of overstocking the market with gooseberries?

MR. PARRY. It is a question of price? My experience is you can buy them very cheap; often sold from two to three cents per quart.

Query 2. For a peach orchard sown to crimson clover, how would be the best way in the spring to apply 300 pounds of muriate of potash and 600 pounds of bone dust?

MR. BLACK. I should apply the muriate of potash in the fall or in the winter, and the bone I would put on at the time of plowing or just after.

MR. E. ROBERTS. There are many orchards hurt by plowing in crimson clover when it is too late. It should be plowed early in the spring.

Query 3. Would vigorous thinning of the top of apple trees, as they approach middle life, help to keep the side and lower limbs alive and vigorous longer at thirty-five feet apart?

MR. BLACK. I do not think anything would do that. When the trees spread out in growing, thirty-five feet is too close.

Query 4. How many pounds of muriate of potash is needed as a yearly application to apple orchards of grown trees?

MR. BLACK. It depends upon the soil and location. I would give from three to four pounds to a tree every four years.

Query 5. Do you think root knot or gall of peach trees is contagious?

MR. COLLINS. I do not know. I would like to give my experience. A good many years ago I bought some trees. They were knotty. My son planted some peach trees amongst those trees and raised a crop of peaches. The trees

he planted did well. I seldom had them do better and we never saw any knots on those trees that were raised amid the knotty ones. This experience is very much against bad contagion.

MR. BLACK. I think if you took up a knotty tree one or two years old and put another in its place it might affect it. I think it would not without it came in contact with the root.

MR. BEEBE. That carries out my theory that it is in the soil.

MR. BLACK. It comes on trees that are planted on soil that has never had a peach tree planted on it.

Query 6. Can anyone tell about the Seth Boyden grape?

MR. ROGERS. All I know about it is that it is considered a good wine grape.

MR. BLACK. It was sent to me and recommended as a good wine grape.

Query 7. What are the carnations in the glass? What are their respective values for market?

MR. BEEBE. The lighter colored ones are the Daybreak; that is with us one of the most prolific bloomers. William Scott is a good bloomer and probably the best paying carnation we have. The Buttercup and Kitty Clover are yellow. The Buttercup is more prolific but the Kitty Clover is the prettier. Both sell well. The white carnation, Lizzie McGowen, is the best white one we have ever grown. It is a poor grower in the field, but in the house it turns out the best. Unless we can get something better we do not care about growing any other. The Bridesmaid Rose, we have here, was put out by Frank Moore, of this State. It has never been superceded by any other. The Morgan Rose is lighter, more shell like, and

not so clear a pink. The Bride, its companion, is the best white under general cultivation. It is considered the best under greenhouse culture. It sells in the market for the best price. The Pearl, yellow in color, is a great bloomer and a splendid rose. It will grow indoors or out.

MR. VALENTINE. How do you like the Della Fox?

MR. BEEBE. Talking from experience, I do not like it so well as expected. It is not so strong a grower and it will not bring in more money than the Daybreak. We can grow three Daybreaks to two of Della Fox. This is our first year and it may grow stronger. It was so weak when we planted last spring that I thought we were not going to get anything out of it. We lost both in the field and in the house and were inclined to think it was a weak grower.

MR. GOBEL. The Della Fox has stood relatively the same as the Bridesmaid stands to McGowen. With the few plants that I have had it is a fairly good grower.

MR. BEEBE. I do not wish to condemn the Della Fox. I was only speaking from the little experience I had.

Query 8. Is soda of any particular value as a fertilizer, and if so how does it compare in value with potash?

PROF. SMITH. It does not compare at all.

MR. ROBERTS. Soda may be of value. I do not say it is not, but the one will never take the place of the other.

Query 9. Is it profitable to raise apples on Paradise stock for market?

MR. BLACK. I should say not.

MR. VANDERVEER. Do they live any length of time?

MR. BEEBE. They live long enough if properly pruned and kept in proportion with the root.

Query 10. Apples at 10 cents per basket ; sweet potatoes at 18 ; asparagus at less than cost ; milk at $2\frac{1}{4}$ cents a quart, and so on—how long will it take the grower to succumb to the sheriff?

MR. BAIRD. I think that very many of us will be able to answer that question in the future, and in the not very distant future too.

Query 11. Is Kainite a remedy for crickets?

PROF. SMITH. No.

THE CHAIRMAN. It did me a great deal of good by spraying with Kainite in the orchard. The next year I had very few. The crickets were so plentiful that they went up the trees and ate the apples on the trees.

PROF. SMITH. Can Mr. Nicholson say in what way?

MR. NICHOLSON. The crickets deposited their eggs close to the surface of the ground and I think the salt from the potash destroyed them. The year before, if I left a basket of apples standing out over night, there would be all the way from half a dozen to a dozen crickets on them in the morning.

PROF. SMITH. I would hesitate very much to say that the potash would have the effect of destroying the eggs under the ground. I could scarcely believe that was conclusive. It must have been something in the atmosphere.

MR. BEEBE. There is not so much potash in it as there is sodium.

PROF. SMITH. There is one thing to be taken into consideration, and that is the eggs of insects are formed of a hard substance, and there is practically no opening into the eggs, and that therefore the only thing that can act upon them is a corrosive or a sort of a caustic potash.

MR. DECOU. There are new varieties of chestnuts reported here, and I think it would be well and interesting to inquire about chestnuts, about some of the new varieties. There are quite a few here who know something on that point.

MR. H. ROBERTS. In looking over this fruit list I find the chestnuts are mixed up with the grapes. I think it was a mistake.

MR. PARRY. I made that exhibition on the table. They are Japan Mammoth and Japan Giant. They are of immense size and come into bearing very young. We have 150 trees of these Japan varieties, and coming so early and being of an immense size, we found them very profitable. They brought \$10 to \$14 a bushel in Philadelphia; later varieties brought about \$5, so we found it a great advantage to have those varieties which ripen very early before frost. Some of them were so early that the venders had not their roasters out yet. They waited for them until they could depend upon the crop and then they took from us exclusively. A great many are used for culinary purposes. The Paragon is now very extensively planted. The demand is for that variety because it is more known. It is not much larger than our American Sweet but it is a very good quality. The Numbo brought \$10 a bushel. The Ridgely was imported here by a man named Redmond. It was thought to be brought over by Dupont.

MR. E. ROBERTS. Do the worms attack the Japanese as readily as the others?

PROF. SMITH. The moth deposits the egg when the nut is very small.

MR. BAIRD. Do you think Paragon is better than Numbo?

MR. PARRY. For the last year we got \$10 a bushel in New York for Numbo. The Paragon is better known.

MR. BAIRD. Is not the Paragon better?

MR. PARRY. I do not know. There is not much difference. I know some people who have grafted the Paragon on top of the Numbo, thinking that it was more exempt from worms.

MR. PARRY. We got a bushel off a tree that was only two years grafted.

Question. Can the hickory be successfully grafted?

MR. BLACK. I think it is a very difficult matter to graft it. I have heard of it being a success but it is very rarely. I think by the ordinary mode of grafting it would not be a success. The only way is to take the limb or the main body of the small tree and make a circle on the body and then another with what you want to graft it and then hip it on.

MR. BLACK. I have often grafted with ring graft trees in July and that is very successful. I have also grafted by inarching. By the ring grafting you will get 25 to 30 per cent. of them to grow.

MR. BAIRD. Were these grafts on large trees?

MR. BLACK. Yes, there were a great many, but only one grew.

MR. BAIRD. The value of this is considerable to fruit growers of New Jersey, because there are lots of trees standing which if they were converted into valuable nuts would be of some use. I have always failed in any attempt I have made to make them live. I have had them to have vitality for may be a year but perhaps no growth. It probably did not get united successfully to hold on.

MR. BURNETT. We graft in the root in our neighborhood and put the dirt up around it and it is pretty sure to grow.

Question 12. Give remedy to keep the bug or louse, as found on the underside of the leaf, from destroying the cantaloupe vines?

Answer. See Prof. Smith's paper.

The meeting then adjourned until 7.30 in the evening.

FIRST DAY:--EVENING SESSION.

THE CHAIRMAN. The hour for commencing our exercises is at hand. Prof. Smith will now enlighten us.

PROF. SMITH. Mr. President and gentlemen: The subject assigned me by the secretary, when asking me to speak this year, is "Insect Depredations of the Past Year," and I have held myself to that topic pretty closely, with the idea that if there is some point in which you are interested, that I have not touched upon, you will bring it out in the discussion which I hope will take place after the paper is read.

INSECT DEPREDATIONS OF THE PAST YEAR.

BY JOHN B. SMITH, SCD. ENTOMOLOGIST.

The season of 1896 has not been marked by the occurrence of any entirely new pest of importance. Our old friends and enemies have been with us in usual numbers in most cases, and sometimes in decidedly destructive quantities. We have had no one tree crop selected for special injury; but if horticulture is to include the growing of cucurbs, these fruits have suffered seriously from the insect known as the melon louse.

It is perhaps well to say, in this connection, that plant lice have been unusually abundant during the present season on quite a variety of crops, and the reason for this may be found in the character of the weather. We do not yet know just exactly what effect weather has on the development of insects in all cases; but we do know that certain bad effects fol-

low certain kinds or combinations of weather. Thus two droughty seasons in succession are very apt to result in an outbreak of the "army worm," and this we had during the year 1896. This species is not troublesome to fruits, ordinarily, and does not need more than a mere illustrative mention here.

A rather even, high temperature, with not too much moisture, not too much sultry weather, and no cold storms, is an ideal condition of affairs for the development of plant lice. Just such weather we had during the season of 1895, and a large part of 1896. The result was a considerable increase in insects of this kind, culminating in a most destructive outbreak of the melon louse. I do not propose to describe before this body either the methods of feeding, or the life history of plant lice. I take it for granted that the bulletins issued from the Experiment Station on these subjects have been read and that you all have a sufficient knowledge of the development of these insects to make it possible for me to speak at once on the subject of remedial measures.

The feeding habits of Aphids or plant lice preclude the possibilities of using stomach poisons. We must reach them with something that kills by contact, or that penetrates into the body in some way other than through the mouth. Quite a variety of remedies offer themselves; but while they may all be effective under favorable circumstances, it does not necessarily follow that their application is always advisable or satisfactory. It is one thing to say that kerosene emulsion kills melon lice. It is quite another to say that we can kill lice on melons with the kerosene emulsion. This seems like a play upon words, but unfortunately it states a fact that we must deal with. It is strictly true that kerosene emulsion, diluted from seven to ten times will kill melon lice, and that whale oil soap at the rate of one pound in four or five gallons of water is also fatal whenever it can be brought into contact with them. It is, furthermore true, that our application of these

substances upon the vines does not always result in the destruction of the insects. The difficulty in these cases is not with the insecticide, but it is due to the fact that we cannot bring it in contact with the specimens. One of the first effects of the plant lice upon the melon vine, is to cause a curling of the leaves. Cantaloupes, as a rule, have the under side of the leaves more or less densely clothed with plant hair, so that they seem almost woolly and when they begin to curl and fold, and crumple up, the insects are protected. The vine also lies close to the surface of the ground, as a rule, and if the plants run, as they sometimes do, three or four feet, or even cover the entire surface when the attack of the lice is most severe, our remedial measures prove useless, simply because we cannot bring our insecticide into contact with all of them.

In order to get results that will prove satisfactory we must, in the first place, anticipate injury and watch closely for the first appearance of the insects upon the vines. It does not need argument to prove that it is easier to kill one insect than it is to kill one hundred, and if we make our application of insecticide when there are only a few lice on the melon vines, when the plants themselves contain only a few leaves, and when these leaves lie smooth and flat, not yet curled out of shape, it goes without saying, that under such circumstances, insecticide measures are very much more apt to be effective than if we wait until the infestation becomes more serious. If the matter be taken in time either the kerosene emulsion or the whale oil soap will prove satisfactory applications. If matters be allowed to run on we must choose another agent. It becomes practically impossible to reach all the insects by means of a liquid and we must resort to vapors, which will penetrate where liquids cannot.

It has been found by practical experience that the vapor of bisulphide of carbon, given off at the ordinary temperature, is fatal to plant lice. Bisulphide of carbon is a clear, almost colorless liquid, with an intensely unpleasant odor, which

evaporates quite rapidly, although more slowly than gasoline or alcohol. The liquid is inflammable, as is also its vapor, and a spark will serve as readily to cause a flash as a flame. Mixed with the air the vapor is explosive, and therefore some care is necessary in handling the substance; but no more than is required for gasoline or benzine. Placed under a cover, a dram or teaspoonful, will fill with poisonous vapor one cubic foot of space, so that no plant louse can maintain life, and in order to fill this space one hour is required. It has been found, by practical experience, that hills infested by plant lice, may be covered by any sort of moderately tight box, and that evaporating in a shallow dish or vessel, a small quantity of bisulphide will result in the death of all the plant lice.

Of course there are practical points to be considered in the matter and the question of cost must also arise; but even at drug store prices of about thirty cents a pound, it will cost only about half a cent a hill for material to make the application, while bought in quantity from the manufacturer, five hills can be treated for one cent. The application is somewhat troublesome, but it is absolutely effective. There is no need of my going into detail on this point, just now. The practical application of the substance is rather for the farmer and his ingenuity than for the entomologist. I have given you a material which will do the work required. It is for you to determine, in the first place, whether it can be practically used, and second, the best practical method to be adopted.

MR. JOHN PARRY. Is one application of the bisulphide sufficient?

PROF. SMITH. Yes, sir. You must draw the earth up around the bottom of the box, covering the plant to keep the poisonous vapor in, as it settles to the ground and may flow out beneath.

MR. JOHN PARRY. Would you place the bisulphide on the ground?

PROF. SMITH. No, sir; it would be lost in the soil. A clam shell placed under the box to put it in, would answer all purposes, and be as cheap as anything you could get.

I have said, elsewhere, that if we could control the weather, we need not fear plant lice. If we could manage to have it at freezing one day, and at ninety degrees the second, we could manage to destroy the plant lice without any difficulty at all. Artificially this result can be obtained by treating plant lice with ice water, and getting our change in temperature by applying the cold water directly upon the insects. Experiments have indicated that ice water makes a tolerably good insecticide, and that, if it can be secured cheaply enough, it makes one of the best things that can be used against aphids. It can be sprayed on exactly as are other insecticides, and the object should be to have the water, when sprayed, just as cold as it is possible to get it.

MR. GILLINGHAM. Will one application of the water be sufficient?

PROF. SMITH. One application will rid them of plant lice.

MR. GILLINGHAM. Would it be very good to apply ice water on a warm day?

PROF. SMITH. I do not know as I would apply water of any kind on a hot day when the sun was shining, but if you apply it while the sun is dropping and when it is not directly upon it, it will be of more benefit to the plants.

You will undoubtedly expect to hear something concerning the San Jose scale. At the meeting of this body, a year ago, Mr. Charles Parry read a paper on this insect, that had the result of bringing the matter up, for action, before the State Board of Agriculture and, later, in the Legislature,

where an appropriation of one thousand dollars was made to investigate the condition of affairs in California, where, it is claimed, natural enemies were keeping the scale in check. The results, in detail, of my observations will be presented to the State Board of Agriculture in a few days, and will also be published in the report of the Experiment Stations. This makes it unnecessary for me to go into details here; but I can say at once that the assertions concerning the condition of affairs in California were only partially in accordance with the facts. It is quite true that in the more southern portions of the state the San Jose scale has ceased to be an injurious pest. It is also true that in the Sacramento Valley and northward it is perhaps the most dangerous enemy yet existing to the deciduous fruits. It is true that natural enemies have done much to keep the scale in check in southern California, and even to practically exterminate it in some localities. It is also true, however, that it still exists in some numbers in almost all the regions that I visited, and that the natural enemies could not keep it in check were it not for the climatic conditions.

THE SAN JOSE SCALE.

We do not know where it came from originally. We don't know its true home. Every place where it has been found outside of the United States, it has been traced back directly to this country, and there is nothing to prove that it did not originate here. The scale does not stand hot weather well; in fact, in the hottest and driest portions of the United States and in Mexico and in Arizona the scale cannot exist at all. It maintains itself, according to circumstances, for a season or two, but finally dies out. So in certain portions of California it does not propagate at all rapidly in hot weather; and further, this very hot weather has the effect of killing off a great many of the young scales, so that the climate is in this direction against the scale.

The San Jose scale breeds in California during just about

the same period that it breeds in the State of New Jersey. It probably begins a week or two earlier in the season, and probably lasts a little longer in the fall; but to off-set this it does not breed well during the hottest portions of the summer. Its enemies on the other hand, have no dormant period at all, and breed all the year round, whether the scale is multiplying or not.

When I got to California in May, I went first to Los Angeles, and there I found a badly infested orchard. I found it everywhere through that orchard, on the trunks and on the branches, and on the leaves thousands of lady birds and their larva were crawling about and feeding on the scale that was just beginning to breed. A few scattering larva could be seen upon the trees at that time and they were picked up by the lady birds almost as soon as they came out. This lady bird breeds during the entire winter season in California. It is this fact that has made these insects so effective in keeping down the scale in some localities. From November to April, certain lady birds and parasitic flies feed upon the scale while it is in the dormant condition in California. With us the very same species that are so effective there, remain in winter quarters from September or October until the following May, giving the scale every advantage and leaving the predaceous insects in a hopeless minority as compared with the scales. Conditions existing in California south of San Francisco, change rapidly as we go north of that point, and when we get into the Sacramento Valley region, at Marysville for instance, we find that natural enemies have lost their influence. Here it flourishes in great numbers wherever active measures are not taken, and here we find, everywhere, establishments for preparing insecticide material in large quantities. The favorite remedy is the lime, sulphur and salt wash; but instead of preparing it themselves, many farmers purchase it, either under that name, or as a patent compound called the Eureka insecticide or something else. Tons upon tons of this mixture are

used, and in one orchard which I visited, car loads of the material were purchased at one time; but then this orchard contains many thousands of trees, and extends in a straight line along one road for a distance of nearly, if not quite, two miles. No one pretends to grow fruit in this region, and as far to the east and west as I could get any knowledge of, without counting upon insecticide applications against the San Jose scale. With them the lime, sulphur and salt mixture is perfectly effective, and again the climatic conditions are such that their experience is of little or no value to us in the East. During a period of several months they can count with absolute certainty that there will not be a drop of rain, and that there will be little or no moisture in the air. The whitewash applied to the trees during this dry season will remain intact until the tree outgrows it, and the character of the lime in the mixture will undergo very little change. In our own State a mixture of this kind would not remain intact more than a week or two, and at almost all times there is moisture enough in the air to change the character of the lime applied in the wash to a carbonate, which has little or no caustic properties and would be ineffective as against the scale, except in so far as it is a mechanical covering. So far as our treatment of this insect is concerned, therefore, we cannot rely upon anything that has been found effective in California. One other matter must be added to what has been previously said :—It is certain that the lady birds imported into California from Australia have absolutely nothing to do with controlling the San Jose scale, and did not, at any time, exercise any influence over this insect. In fact a good deal of the talk heard in California concerning these insects is without any basis of actual fact. People talk glibly of "*Rhizobius*" at meetings or in print, and when the practical test is applied, they do not know *Rhizobius* when they see it. A very good example of this was furnished by one of the men who, in California, has written freely concerning the beneficial effects of *Rhizobius*

debilis and others belonging to the same genus. He contracted to furnish me a large number of colonies for experiment and sent a considerable number of specimens into the State of New Jersey under his contract ; but although he asserted positively that all of the insects were specimens of *Rhizobius*, and most of them were *Rhizobius debilis*, a supposed enemy of the San Jose scale, yet, as a matter of fact, not a solitary specimen of *Rhizobius debilis* was contained in any of the sendings, and scarcely anything except common California Scymnids, which have no effect whatever upon the scale. In other words, by far the greatest portion of what has been spoken or written in California, concerning *Rhizobius debilis* and some other species, deserves no consideration whatever, because there is no proof that the men who wrote, knew the species they were writing about, and there is plenty of proof, on the contrary, that they did not know the species. Nevertheless, in spite of the fact that the Australian insects in California are by no means common, I did succeed in getting a considerable number of colonies into New Jersey, and liberated several hundred specimens myself, in infested orchards, principally near Riverton.

A variety of experiments have been made with insecticides against this insect, most of them without definite results ; some of them, however, rather satisfactory. In a test of the effectiveness of whale oil soap-suds, which was meant to be conclusive, it was found that the recommended mixture of two pounds in one gallon of water applied on young, infested trees, cleared them absolutely. The application was made in mid-winter and the trees were closely examined several times during the season of 1896, not a living scale being found at any time. All the treated trees were young and the application was made with a brush. The material was the Leggett brand of whale oil soap, which remains liquid when cold even at the strength recommended above. It is a good test of the purity of a potash fish oil soap, by the way, that it remains liquid at the rate of two pounds in one gallon of water when

it becomes entirely cold. If it jellies, animal fats are contained in the soap, and it will not be as effective.

The discouraging feature in the case is, that the scale is constantly turning up in new localities. Several points in Monmouth county have been added to those previously recorded. One case in Hudson county has occurred, and even in Passaic county an instance has been reported. Finally, it seems likely that in Hunterdon county there is a point of infection, giving the insect a much greater range than had been heretofore supposed possible.

Two very interesting tests have been made with kerosene. In one case, in Ohio, a grower whose orchard was more or less infested with the scale, sprayed his trees twice with pure kerosene, rather more than a month intervening between the two applications. The trunks were painted with a large brush, the balance of the tree was sprayed with a Vermorel nozzle. The man was cautioned before making the application that he risked killing the trees. He concluded that he would just as lief kill them himself, as to have the scale kill them, and persisted in the application. The result was the total destruction of the scale, and no perceptible injury to the trees. Late in August of 1896 the trees, peach and apple, were in flourishing condition, and no sign of any kind of injury was apparent. In our own State, a gentleman near Jersey City, who owned several trees, made the application in mid-summer, during the hottest part of the season, and on one of the hottest days. Pure kerosene was sprayed on all parts of the trees. No damage was done to the trees, while the claim is that every scale was destroyed. There is no doubt that pure kerosene, applied as already suggested, is death to the scale. If it does not injure the trees, as these experiments seem to prove, I think there is no further question as to our ability of checking the progress of this insect. I do not intend, positively, to recommend the application of pure kerosene. I am not at all satisfied that no injury will result to the trees; but at all events

the matter is worthy of your careful attention, and those of you who may be unfortunate enough to be troubled by the San Jose scale, might easily make the experiment of risking a few very badly infested trees.

Perhaps I might add a few words concerning legislation on this subject. Nothing has so aroused public interest of late as the rapid spread of this scale, and in several states the law-making power has been invoked to check it. Virginia has established a rigid inspection law and Maryland has enacted also a quarantine regulation, admitting none but stock certified by a state officer to be free from scale, within her borders. Illinois and Ohio either now have or expect to have similar laws, and legislation looking to the destruction of insect pests seems likely to be had in several other states during the present winter. New Jersey has been, rightly enough, very conservative in this matter, and has adopted the cautious policy of first learning all about the subject before legislating on it. Unless we can have a very stringent law, stringently enforced, it may be better to leave our statute books free at present.

On this subject of legislation with reference particularly to those who are interested in the nursery business, I would say that in Maryland the law is very stringent and no stock is admitted into the state unless it is accompanied by a certificate or copy of a certificate, stating that the nursery has been examined by an entomologist and that it has been found free from the San Jose scale, peach yellows, etc. Perhaps it would not be an inadvisable thing for the nurserymen to look into this matter and for the Horticultural Society to secure the appointment of a state officer and of some means by which official inspections can be made. Of course there have been a number of applications to the Station to have nurseries examined and we have generally responded; but there are no funds available for making inspections of this kind, as they are for the primary benefit of the nurseryman. I am the entomolo-

gist at the College Experiment Station, not of the State of New Jersey. I was also appointed entomologist to the State Board of Agriculture, but that is an honorary position and there are no funds provided for doing inspection work or work of that character. It is a matter in which the Station wants to do what is best for the State at large and as far as possible to benefit individuals. It would be well for you to consider whether it would not be advisable to have an officer who may make any such inspection under our own laws or under the laws of other states. I throw that out as a suggestion and make no further remarks upon it.

The sinuate pear borer does not seem to have spread very much during the summer of 1896. In some localities where it has been very troublesome in the past, its ravages have been checked by vigorous action on the part of the growers. At the Roselle Nurseries, for instance, where three or four years ago forty per cent. of the young trees were infested by the borer, it is difficult, this year, to find an infested tree. This result has been obtained by the prompt destruction of all trees as soon as it was noticed that they were infested. As the borer takes two years to arrive at maturity, we have a long period to detect it, and radical, remedial or destructive measures may be applied at almost any period of the year. Those bearing orchards that were infested a few years ago are being rapidly killed out, and for some reason the insect does not seem inclined to take long flights. The danger is, however, that some specimens may migrate to new localities where they will not be discovered for some time to come, or until they have done considerable harm. It is also to be noted in this connection, that some of our predatory insects have increased considerably where this pear borer occurs, and have manifested a fondness for its larva. In quite a number of instances I have found in the burrows the larva of a predaceous clerid beetle, and now and then a pupa cell of the borer completely eaten out. The sinuate pear borer is not a very rapid

breeder, and as the forms that prey upon it come to maturity in one year, it is not too much to hope that it will, in a few years be reduced in number, if not entirely exterminated by nature's own efforts.

This seems to be a good place to refer to the mechanical coatings of trees, which were recommended to keep out borers and to retain within the trunk those that might have already entered. "Raupenleim" and "Dendrolene" promised exceedingly well when tested two years ago; but they have somewhat failed in the purpose that they were expected to fill. It has become evident that where "Dendrolene" is used continuously—that is, allowed to remain on indefinitely for a year or more—it will become gradually injurious to young, growing tissue. This is not because it is either a corrosive or directly poisonous in any other way, but because of the fact that gradually very active young tissue is penetrated by the soft pasty substance, resulting in the death of the plant cells immediately beneath it. On older trees, where the outer bark is no longer active, no sort of injury has been noted; but it would be very much better not to use anything that affords the least chance of injury. Quite a variety of coatings have been proposed to keep out borers, or to keep them in; but none of them strikes me so favorably as that which was brought to my attention only a short time ago by Mr. Woodward, who is on your program for to-morrow. He suggested the use of hydraulic cement mixed with skim milk. This can be applied with a brush, as thinly or as heavily as needed. It will form a perfectly solid coating, no part of which can be absorbed by the tree, and which is sufficiently brittle to crack gradually as the tree grows. It cannot be penetrated by insects of any kind, either to enter the bark or to emerge from it, and it does not wash off readily. I will let Mr. Woodward explain the details of the application, just what use he makes of it, and just what the effects may be on trees of all ages.

The "pear midge" has extended its domain somewhat in

our State, and in some localities has done some injury ; but it has not been nearly as harmful as in past years, or, at all events, has not been so much complained of. It may be remembered that I recommended the use of kainit, applied to the surface of the ground at just about the time that the larva drop from the pears, and reported good results from experiments made under my direction. It may be interesting to note that this measure was given a thorough test in New York State, in one of the orchards in the Hudson River Valley, and it proved as effective there as it did in New Jersey. In the test that was made it was found that the soil beneath the trees where kainit was applied did not contain one midge larva, where soil under the trees that were untreated contained hundreds. Finally, it developed in this experiment, that persistent cultivation would also result in a very decided check to the increase of the insects. This is easily understood, because constant stirring of the soil, even if it is only shallow, will result in exposing a great many of the specimens to the effects of surface surroundings, and will bury others so that the adults will find it impossible to emerge. The insects themselves are soft and delicate, and a great many of them undoubtedly are destroyed during the process of cultivation. The ideal measure is to combine cultivation with the application of kainit, and from the experience that has been gained in the past, I think that this insect can be controlled, so that practically no injury will result, by carefully cultivating the orchards from the middle of June to the beginning of July, and applying some time during the last days of June a heavy top-dressing of kainit, just after cultivating. The kainit can be applied at the rate of one thousand pounds to the acre, and of course, if this application is kept in mind, other fertilizers can be applied at the most desirable season, leaving all the potash that is intended for the orchard to be put in, in the form of kainit, during the latter part of June. I need not speak to you of the value of potash in an orchard and when

the application is made at the time suggested, the trees will get it in ample season to help them grow and perfect the crop of fruit.

While on this subject, and although the onion may not be strictly speaking a fruit, I may mention the fact that kainit still maintains its value in destroying the onion maggot. Your fellow member, Mr. T. D. F. Baker, of Bridgeton, has had a remarkable experience with this insect during the past year, which should be put upon record and which well illustrates the value of kainit as an insecticide in special cases. Mr. Baker has now had several years' experience in dealing with the onion maggot, and has, in every instance, succeeded in controlling it by the proper application of kainit. I will let him tell his own story if you wish to hear it.

One of the troubles that has been most frequently complained of during the past season, on fruit trees, has been the bark borers, and particularly has that been true of peach and plum trees. The first indication of the presence of these insects is usually an exudation of gum from a little round hole. Where only one of these little drops of gum occurs, it is hardly noticed, but where the entire bark becomes studded, it attracts attention, and then, as a rule, if the bark be cut into, it will be found that between it and the wood is a short gallery or burrow, which may or may not contain a black beetle. If undisturbed this burrow will become about an inch in length, or even a little longer, and from each side of it branch galleries will be run by little white, grub-like larvæ. These in turn change to beetles after making a gallery about two inches long, gradually increasing the size of it as they themselves increase in bulk. Eventually, each of these larvæ, when they have changed to beetles, will bore a little round hole through the bark to the surface, and again bore another one to get into the tree again, to start a colony of its own. Peach trees do not stand this kind of treatment very well, and succumb rapidly to the attacks of these insects where they become at all numerous

It is a peculiarity of these species that they attack only trees that are a little under the weather, so to speak. Trees that are not as vigorous as they should be, and in which the circulation is not so active as to destroy the insects that happen to bore into it. Peach trees especially respond very easily to outside conditions, and no trees suffer more quickly from adverse surroundings than does the peach. A period of drought or a lack of sufficient nourishment may cause a peach to offer a good ground for the attack of these insects, and the best recommendation that can be made to prevent harm from these bark borers, is to keep the orchard in as thrifty and flourishing a condition as it is possible to do. Liberal applications of fertilizers should be made, the ground should be kept in such condition that every particle of moisture will be readily absorbed during a dry period, and that as little of it will be allowed to escape into the air as can be managed. One other point must be kept in mind, and that is, when a tree becomes badly infested by these insects, it is doomed, and the sooner it is cut out and utterly destroyed, the better it will be, not only for this particular tree, but for the orchard as a whole. In other words destroy the source of infestation whenever it is possible to do so. Nothing is gained by keeping a tree filled with bark borers, while much may be lost.

In some parts of the State, strawberries were rather severely injured by a variety of insects. There was considerable complaint from some of the more southern counties, of harm done by the strawberry weevil. It was claimed that a considerable percentage of the crop was destroyed by these insects and no feasible measures have been, as yet, recommended to check them when they appear on the crop in large numbers. The larvæ feed upon pollen, and therefore, of course, only such varieties as produce pollen are attacked. It has been recommended that where this insect is abundant, pistillate varieties chiefly be planted, and that pollenizers be confined to separate rows, and as few of them as may be to

attain the necessary fertilization of the other varieties. A few rows could be kept covered during a part of the time and until the buds were ready to open, or, on the other hand, the varieties could be so intermingled that the pistillate plants would bear as much crop as was desired, even if the great bulk of the staminate flowers were destroyed—enough of them coming to maturity to produce pollen for the others. A perfect flowered variety like the Sharpless, alone, is least desirable. One of the unsatisfactory features of this insect is that we have no means of saying in advance whether or not it will be injurious in any particular season. It is one of those creatures that comes by fits and starts, and without rule or reason. It may be injurious for one, two or three years in succession, and it may then disappear, not to be seen or heard of again for one or a number of years afterward.

Root lice were complained of in certain localities as infesting strawberry plants, and certainly, from samples that were sent in to me from Atlantic county, considerable injury must have been caused. It is a matter to be noted that in those same fields in which the strawberries were attacked by root lice, there was also a considerable quantity of weeds, among which purslane was quite prominent. On the roots of the purslane were found plant lice very much like, if not identical with those found on the strawberries, and it is more than likely that purslane is the real food plant of these lice, and that strawberries were only attacked when the original food plant became insufficient to maintain them. It ought not to need more than this suggestion to induce all growers of this fruit to keep their strawberry beds as clean as it is possible to do so, and further, in the case of strawberries, very great care should be taken in the preparation of the land and just as little coarse manure should be used as it is possible to get along with. The commercial fertilizers are very much better from the entomological point.

Leaving aside for the moment, all questions as to its

availability as a plant food, or the quality of the various elements contained in it, and speaking strictly from the standpoint of the entomologist, it is certain that nothing worse can be put upon land than ordinary stable or barnyard manure, particularly if it is mixed with coarse material and bedding. It forms just the surrounding most congenial to a great variety of insects that live in or just on the surface of the soil. They find hiding places among it for the winter. In some cases it furnishes nourishment to tide them over a period when nothing else can be obtained, and there is nothing in it that will harm even the most sensitive kind of insect life. Of the commercial fertilizers the phosphates, whatever their form, have practically no insecticide qualities. An exception may perhaps be made in the so-called "odorless phosphate," which is simply a finely ground slag. This is sometimes useful as against insects, owing to its very fine condition, and perhaps also from what may be contained in the material outside of the phosphates themselves. Nitrate of soda and the salty forms of potash are good insecticides. Chlorides as a rule are effective, and the greater the amount of chlorides placed in the soil with the fertilizers, the less trouble there will be with underground insects. It is this fact that makes kainit the best of the commercial fertilizers from the entomologist's standpoint. It contains not only common salt or chloride of sodium, but also chloride of magnesium, and the combination of these two chlorides with the potash seems to be particularly offensive to most insects. I have already referred to this subject under a previous heading, and will only add as a conclusion, and bearing upon this same general feature of the case, that good farming—using that term in its widest sense—is one of the best measures for preventing insect injury. What good farming is, several of your members know, and I will leave it to them to inform the others.

MR. PARRY. Is there any whale oil soap made from potash, known as potash soap?

PROF. SMITH. The Leggett soap is a pure whale oil soap; and recently a Philadelphian, named James Goode, makes a soap, according to a formula which was furnished him at Washington, which makes a good potash soap.

MR. ROBERTS. While experimenting with fertilizers I found that kainit would kill the white grub as a general rule.

MR. MILLER. I found it would kill the strawberry plants too. I lost five acres.

PROF. SMITH. How strong did you use it?

MR. MILLER. I used it quite strong, and scattered it and then cultivated it. I found that just as soon as it rained a lye was formed that would eat the plant, root and all.

PROF. SMITH. How strong did you use it?

MR. MILLER. I could not say. We used muriate of potash; then we used kainit. We made our own fertilizer. The year before we used common salt, and we thought it drove away the grubs. I do not think there is anything that will destroy the white grubs, after they are once in the soil, except to dig them up by ploughing.

PROF. SMITH. There is one thing certain that applications of kainit have been made with very good results. If you will ask Mr. Baker to-morrow about these experiments, he will tell you that he used it on onions, and that it stimulated the growth of the plants and it did not harm them. That does not mean, however, that it will not, under certain conditions, destroy strawberry plants.

MR. MILLER. We applied salt and found that it drove the grubs away, but they came right back. We did not apply a great deal of salt, as we thought it might injure the plants.

MR. ROGERS. May I ask the varieties?

MR. MILLER. We grow nearly 100 varieties.

MR. ROGERS. What would it kill the most?

MR. MILLER. It would kill all varieties. I do think there is no difference in the strength of the roots of strawberries. If you soak them in salt they will all die.

MR. BLACK. I prefer, if my land is infested with grubs, to apply a coat of muriate the Fall before setting the plants, 1000 pounds to the acre, but if applied a little while before planting it will injure the plants.

PROF. SMITH. Where you have your land covered with vegetation during the month of June or July, at the time the eggs are laid, the grub lives for three years in that condition, so that for two years the ground would not be safe to plant on.

PROF. SMITH. The San Jose scale does not seem to extend much further north than New Jersey, and although it seemed at one time to have a foothold near Albany, it has been entirely blotted out. There seems to be a certain kind of soil that it follows. It extends over to Long Island on soil of the same general character as it is found in here. It extends also to Connecticut and Massachusetts, and it runs up some of the rivers of Massachusetts, so that it seems to follow a certain geological formation. Just why that should be I don't know. There is some peculiarity in the climate, something in the surroundings, but just what it is, we have not been able to determine.

MR. PARRY. Don't you think it is from lack of opportunity?

PROF. SMITH. I think it would be very difficult to say that, Mr. Parry. As nearly as I can find the infested stock has been about as freely sent out in the northern part of our State as in the southern, yet I have not received a single specimen from people in the northern part of the State.

MR. WM. PARRY. Have you tried planting in the red shale?

PROF. SMITH. I will tell you what I have done and what I have recommended. The suggestion was made that there might be some element in the soil of the shale not present further south and all that we could learn of was iron. I hope to try some experiments this coming spring by introducing iron into the soil, to see whether the addition will have any effect, and one reason why I intend to have that experiment tried is that it was recommended by some of the orange growers in California to use iron in some of the fertilizer. There is no proof, but strong assertion, that where iron is used the trees do not suffer so much from scale insects. We are losing no opportunity to make tests of anything that may come into use. The scales spread for a time in Florida, but seem to be dying out there, attacked by a specific fungus disease. A quantity of the red shale could be brought into the lower part of the State and a tree planted into it. We can easily arrange for that. If it is climatic, the fact that it pertains to the soil will make no difference. The only chemical element that is present in the red shale, that is not present in almost equally as good condition in the sand where the scale grows, is iron, and it is possible that the addition of the missing chemical element may give some good results. We can arrange to try that this coming year.

MR. BEEBE. Would not a fertilizer with iron in it have the same effect?

PROF. SMITH. Yes, if it was soluble. If the sulphate of iron was dissolved in water, fifty pounds of sulphate of iron to an acre would be an abundance.

On motion of Mr. Baird a vote of thanks was tendered Prof. Smith for his very interesting lecture.

HOW TO PLANT AND WHAT TO GROW.

BY CHARLES BLACK.

Mr. President and Gentlemen:—This is a very difficult question to answer and one I do not feel competent to do intelligently. It is of such large application that very few who undertake it succeed. Many intelligent horticulturists do much harm in undertaking it, as there is so much to be taken into consideration, such as soils, climatic influences, markets, etc. He may give his methods and list of varieties that succeed with him, that may prove worthless a few miles away, and he is censured for misrepresentation. This is especially so with the strawberry. I always hesitate to give any one a list of strawberries when asked what to plant. All that can be done is to give such as have done well generally, and each planter should test them in a small way first and prove which is best suited to his conditions.

I will begin with the strawberry by giving the most simple and common mode of culture, so that I may make it plain to the beginner. Practical growers do not need my instructions. The strawberry will succeed on a great variety of soils, from a stiff clay to a light sandy loam. To succeed well it requires a soil rich in the elements it needs and it is scarcely possible to take a poor soil and make it in proper condition by heavily manuring the same season that it is planted. It is better to take soil that has been well manured with stable manure a year previous to planting; then a good dressing of from 500 to 1,000 pounds of ground bone and 300 to 500 pounds of muriate of potash to the acre should put it in proper condition to grow a crop. The muriate of potash should be applied at least a month before planting. The bone can be applied after planting in the Spring and worked in with the harrow. Work the soil until fine and level. I run a plank clod masher over it which levels without compacting. Mark it out four feet with a furrowing sled, with the shoes so adjusted that they cut a narrow furrow three or four inches

deep. If soil and weather is hot and dry do not mark out the furrows much faster than they are used, so the soil will be moist where plants are set. Have the roots of the plants dipped in water as fast as wanted. Set the plants fifteen to eighteen inches apart and as near straight up and roots as well down in the furrow as possible. Have the crowns about level with the surface, then let a careful man with a hoe cover the plant with a hoe of mellow soil just up to the crown. Step on it with one foot as near the plant as possible. Withdraw the foot and bring a little mellow soil over the foot mark and it is complete. It takes but two movements of the hoe and the plant is set much better than by hand. Any one can soon become an expert at it, and a good man and careful boy can set from 5,000 to 8,000 a day. This will not do when the soil is wet as it would bake hard where the foot pressed the plant. The drier the soil the more important it is to have the plants pressed very firmly. To ensure success set plants as early as possible. There is very little loss from plants properly set before the middle of April. Give them clean, shallow cultivation as near level as possible, with cultivator and hoe, up to about August 1. Let them make a matted row eighteen to twenty-four inches wide. It is better not to set plants too thickly. If they make a strong growth the row can be left wider. Should they have made a good stand of plants by August 1, it will not injure them to let the summer or crab grass grow in them. It will fall down and make a mulch through the winter and keep the fruit clean. If the plants have not made sufficient growth up to that time the grass will have to be kept out two weeks later. If possible give them a dressing in early winter of partially rotted stable or other manure. This will act as a mulch and also keep the fruit clean. Cut straw, corn stalks, or any short material will do. Long straw or stalks will not do on matted rows unless put between the rows where there are no plants. Should they be left to fruit the second season, plow up the middle between the rows, leaving beds eighteen to twenty-four

inches wide. Clean out the beds and cultivate between the rows through the season. Varieties to plant: This every grower should decide for himself by trial or from the experience of others in his vicinity, as we have but few varieties that do well everywhere. Among those generally tested are Michels and Meek's Early, very early and strong growers, but not very productive; medium early, Crescent (pistillate), Bederwood and Jessie. Medium, Downing, Sharpless, Bubach (pistillate), Haviland (pistillate), Greenville (pistillate), Lovett, Lawrence, Beverly and Dayton. Late, Enhance, Kentucky and Gandy. Such varieties as Sharpless, Downing and Gandy do best on rather heavy soils. It is useless to plant Gandy on light warm soil. I have named all of the pistillates. These need fertilizing by planting every fifth or sixth row with some good perfect flowering sorts. Any of those named will do except Kentucky and Gandy, which bloom too late for most varieties.

Raspberries will succeed on a great variety of well drained soils. The red varieties require richer soils than the black. They can be planted in the Fall or early Spring, in rows six feet apart and three feet apart in the rows. Give them thorough cultivation to August 1st or 15th, according to the season. It is very important to keep the plants growing through August and September. Cut the canes well back after growing one year, so they will make strong fruit canes the second year. When the young canes of such varieties as Cuthbert and all of the black caps have grown two and one-half to three feet high, pinch out the top and they will make strong well branched canes. These branches must be cut back within six to eight inches of the main stock when pruned in the Spring. Leave only two or three canes to grow in a hill of the Cuthbert and the black varieties. The other red varieties can have more cane and need not be headed back until pruned in the Spring. Under this treatment they form strong tree-like canes and produce immense crops of fine fruit. Varieties that are

not pinched back in summer need cutting back to three feet high when pruned at bearing age. Manure well in early Fall or Winter with well rotted stable manure. A dressing of fine bone at the first plowing in the Spring will benefit them. I prune any time from February until April 1. The old canes can be cut out at any time through late Fall or Winter. After testing many varieties I find but few reliable with me. For very early and nearby markets the Turner (red) has proved most profitable. Medium, Miller (red), is a good grower, of fine color, and an excellent shipper. Late, Cuthbert (red), so far has no rival. It should be closely picked or it turns a dull color. Golden Queen is the best yellow. This is very similar to Cuthbert, except in color. For black the Souhegan is the best very early, followed closely by Lovett and Kansas. These are very fine and the best I have tried. For late the Gregg is the best. Shaffer's is a strong grower, very prolific and fine for family use or local markets, but its dull purple color unfits it for a shipper. No fruit that I raise pays me better than an acre or two of well cultivated raspberries.

Blackberries require about the same character of soil, cultivation and treatment as raspberries, except the rows should be seven or eight feet apart instead of six feet. Cultivate up to about August 15. It is important that you should keep your raspberries and blackberries growing as late as you can to prevent the attack of a rust on the leaves. This stops the growth of the plants and the foliage turns yellow or drops off in September and the plants are weakened and will not stand the cold. I have tested this matter thoroughly, and find the later my plants grow, the better they withstand the cold. I have had full crops of raspberries the past two seasons when many neglected patches were nearly a failure. Since the decline of the old Wilson we have no real first class market blackberry. Wherever the Wilson succeeds, it is the best for market. Early Harvest has been largely planted in Mercer county, and where thorough culture and close pruning is

practised it does well. When neglected it is very poor and is not early. Lawton and Erie are planted quite largely and I am unable to detect any difference in the two varieties. They both have the defect of the fruit turning red, especially in hot weather after picking. Lucretia, a dewberry, is very large, firm and very early, but it trails on the ground and is rather difficult to cultivate. I grow it on good sandy soil and keep it in rows the best I can. It yields well, is rather tender and needs slight protection. This I give by throwing some coarse material like potato vines, etc., on the rows, and throw it off in the Spring. Early King is the best in quality of all; is very early, of fair size, but fruit rather soft and canes very thorny; for home use and nearby markets think it will do well.

Pears.—Until a few years past the pear was considered one of the most profitable fruits. The blight and unfavorable conditions of our markets have done more to discourage the pear grower than over-production. I still have great faith in pear culture. This blight will pass over, and I hope our markets will soon get in better shape; then those who have good pears will not regret it. The pear needs high well drained soil, and it is no use to plant them on soils not naturally well drained. They send their roots deep down in the subsoil and do not want to come in contact with water during the growing season. Gravelly, loamy or clay soils, with clay subsoils, is best for most varieties. The orientals, like Kieffer, Le Conte, etc., will thrive in light sandy soil and bear fine fruit. Plant twenty by twenty feet in the Fall or very early Spring. Cultivate thoroughly by growing hoed crops among them and manure the land well. Keep them well cultivated up to the bearing age, say six to ten years. If the soil is light and they need extra manuring, it can be done by sowing crimson clover from July 1 to August 15 and turning it under the following May. This can be followed as long as they need manuring by giving them a dressing of say 500 pounds per acre of muriate of potash. If the soil is clay, every three or four years a

or of a heavy nature, a dressing of lime, say thirty bushels per acre, will keep the soil in good condition with the clover. They need constant pruning from the first. When first set the top wants to be formed by leaving only three or four branches, and cut these back one-half. Do this each year, thinning out the top and cutting back the young growth. The top thus properly attended to, a pear tree never requires any more pruning than can be done with the pruning shears. This is very important with the Kieffer, as it throws up long slender branches which will load themselves with fruit, when four or five years old, and break down with the weight. With proper pruning they will not bear much fruit before they are about six years planted, and will then have a short, sturdy top that will hold the crop of fruit. Thinning the fruit, especially the Kieffer, is very important. The fruit should be picked or some way taken off when it is the size of a walnut. Leaving them four to five inches apart all over the tree will make as many bushels and the fruit will be much finer and trees in better condition for the coming season. For the middle and southern portions of our State there are but few varieties that will pay the ordinary orchardist to plant. Clapp's Favorite, Bartlett, Kieffer and Le Conte comprise about all of the best market varieties. The Kieffer and Le Conte are best adapted for light sandy soils, and with proper culture and manure will succeed well where all others would fail. In other sections of our State many other varieties succeed and pay well.

Peaches, in many sections of our State, are claiming as much or more attention than any other fruit and we are producing good crops of fine fruit and I believe that we have less of the yellows than many of the peach growing states, such as Maryland, Delaware and Michigan, although many of our orchards are small and planted by farmers who do not take good care of them. High or rolling, loamy or gravelly soils, with clay or gravel subsoils, with good natural

drainage, is the most suitable. Many varieties do well on sandy soil, but they are not generally as long lived, and are more subject to the borer and black aphid. Some varieties will not do on sandy soils. The Crawford Late, for one, is very unproductive on light soils with sandy subsoils, but when planted on gravelly soil with clay subsoil it is often very productive. I prefer medium, or small sized trees, cut back to twelve inches or so when planted. Plant eighteen by eighteen feet, or better, twenty by twenty feet. Be sure and not plant deeper than they stood in the nursery. This is very important on heavy soils. The peach root wants to be near the warm surface when it is growing. Pruning after one year's growth, select say three of the upright branches to form the top. If there are but two leave only one, cutting that back to two feet and let it form a top the next year. If first class trees are planted prune to a straight stem, leaving it three and one-half to four feet. For the first two or three years plant some crop that needs thorough culture. Some low growing crop is better than corn. If the crops grown in the orchards are well manured the trees will not need any special manuring until after the first crop of fruit. Then with bone, potash, crimson clover and thorough culture they should be kept in first class condition. Should be pruned enough to keep out the dead or half-dead wood and to keep the top open to let in sun and light. After one or two heavy crops they will need pretty thorough pruning to keep up the vigor of the trees. All of the red varieties which have had heavy crops need much more pruning than the large yellow sorts like Reeves' Favorite, Crawford's Late, etc. Give shallow, level culture and never plow or work the soil deeper than three or four inches. Plow early, before the leaf starts, after which they can be kept in good condition with a disc or cutaway harrow. Where crimson clover is grown the plowing will have to be delayed until the clover has made some growth, say May 1. Markets and soils have a great deal to do with the varieties

we should plant. For local markets a succession through the season is the best. Where the fruit has to be shipped to large cities it is best to have varieties that come in when the markets are not so full from other sources. There is a great confusion in varieties of the peach. Soil and locality often change the appearance of varieties and they are renamed. Many new varieties sent out prove to be of the same character as some older sorts. This is generally so when they originate in Texas. The Wonderful was supposed to be a very fine new peach, but when planted in orchards it proved to be a Smock. It is not safe to trust new and untried varieties introduced by fine lithographs and exaggerated descriptions. This almost invariably leads to disappointment. It is safe to plant old, well tried varieties known to succeed in the localities. For local markets and warm soils the Early Rivers is one of the most profitable. Mountain Rose, Champion, Old Mixon, Reeves' Favorite (yellow), Stump the World, Elberta (yellow)—these seem to succeed in nearly all soils and localities. Crawford's Late (yellow), Fox's Seedling (one of the best), and Smock (yellow)—this list is one that will succeed wherever peaches can be grown at all, and gives a complete succession. There are many other varieties that do well in certain sections of our State, such as Stevens' Rare-ripe, Bray's Rare-ripe, Ford's Late (white), Keyport White, etc. These last named are more sectional and do not do well in all sections. I have noted the yellow and white varieties; all of the others are red fleshed.

To prevent the ravages of the borer make a mound of soil a few inches high at the base of the trees. Allow this to remain until September or October, then level it down and with a coarse cloth rub the tree thoroughly. This will take off all the small borers that have collected below the surface. If this is done again the following May and kept up for a few years they will do but little damage. This is more necessary on sandy soils where the borers work most.

MR. MILLER. What do you think of the Maxwell's Early blackberry?

MR. BLACK. I have not fruited it.

MR. MILLER. What do you think of the Le Conte pear?

MR. BLACK. It has sold well in New York City. In the Fall of 1895 it brought me more than the Kieffer.

MR. MILLER. Will it blight?

MR. BLACK. It will blight.

MR. DECOU. Any worse than the Kieffer?

MR. BLACK. Fully as much, although we have not had any blight with us during the last season. In 1895 we had some.

CULTIVATION OF VACANT CITY LOTS BY THE UNEMPLOYED.

BY J. B. ROGERS, NEWARK, N. J.

In the summer of 1894, when more persons than usual were out of employment, on account of the hard times, Mayor Pingree, of Detroit, conceived the idea that vacant lots in or near that city could be cultivated by the unemployed poor, whereby subsistence could be obtained for the winter. This is known as "Potato Patch Farms" or the "Detroit Experiment."

Early in 1895 this experiment having come to the attention of several gentlemen residents of the city of New York, they invoked the assistance of the Association for Improving the Condition of the Poor, and the unemployed planted 69.75 acres of land to potatoes and vegetables. These acres were allotted to eighty-four persons, in plots of various sizes, containing from

one-quarter to eight acres. The total income from cash sales of these 69.75 acres was \$5,962.77, exclusive of vegetables used during the summer by the growers, and in a few instances winter supplies. The average sales per plot, \$73.81; average per acre, \$85.48. The highest income from an acre, \$372; the lowest, \$23.

The ground was plowed and given to the cultivators rent free. Four persons paid for tools, seeds and fertilizers; one furnished his seed, and seventy-nine, owing to their poverty, had all given them. Twenty persons had two years' or over experience in farming. The ground was within three miles of the limits of New York City. The product all sold at retail, the sellers realizing double or more what the crops would have brought at wholesale, and no expenses of sale to come out. An experienced agriculturist superintended the planting and culture. The fertilizers were principally street sweepings; most of the seeds were given by seed growers and of the best quality; culture intense, and the plots yielding the greatest cash returns were those on which the finest product was grown.

The vacant lot farmers in 1895 were awarded second prize on exhibition of vegetables at New York City Live Stock Show, and also at the American Institute Fair in 1896. The award in 1896 was given in competition with as well grown vegetables, by experienced professionals, as I ever saw exhibited. The standard of judging the highest and strictly enforced. Very few of the awards at the Inter-State Fair, Trenton, New Jersey, on vegetables could have competed at the American Institute Fair. The vacant lot farm exhibit can be classed as of the highest grade for the best and most fastidious retail trade of New York City.

Only within the past few years have physicians given much attention to publications on the food and diet of the people. One of the latest, "Appleton's Medical Library" on "Practical Dietetics," is an authority. It says: "One-

fourth meat, with three-fourths of vegetable produce, would furnish greater variety for the table, tend to maintain a cleaner palate, in creating zest for food, a brighter and more active brain, and a better state of health, for most people not engaged in the most laborious employments of active life." It summarizes culture; fit and suitable land; heavy fertilization; best and most improved seeds; to be marketed when of proper size and fresh.

The distinction between culinary and cattle vegetables; those intended for food of man, at least fifty per cent. or less of the cellulose or woody fibres must be digestible; more than fifty per cent. of cattle vegetables are indigestible by man.

The exhibitors at the American Institute Fair following these suggestions, plant many varieties of vegetables weekly, thus rendering them digestible and of the best flavor and quality. In the newer and more highly improved strains of vegetables the best flavor is of short duration. This gives an advantage to the vacant lot farmers over growers at a distance, unless shipments are made in refrigeration cars, by means of which vegetables can be transported thousands of miles and arrive in good order as to digestibility and flavor. The question may be a pertinent one for New Jersey vegetable growers to consider, whether refrigerator cars would pay them and whether the South has any advantage over them in this respect.

In 1895 the committee having vacant lot culture in charge, "insisted that half the land at least (assigned to each person) should be planted with potatoes, because the risk of this crop is small;" yet at the close of the season the report continues, "although with proper fertilizers and great care as much as eight hundred bushels of potatoes can be raised on an acre, we think it would be best to give less land to potatoes and more to early vegetables. These potatoes were sold by the quart or half-peck, and had the planter sold his entire crop of from four to eight barrels at one time he would have

received only wholesale rates. The potato crop was choice. In 1896 very few potatoes were planted, the growers saying the crops did not pay even when sold at the very highest prices of the season. The reason why potatoes do not pay may be inferred from a quotation of report of 1895." Some of the cultivators, who kept count of the number of days they worked, show the surprising conclusion that they earned not farm wages (seventy-five cents per day, with board and lodgings for the worker), but skilled mechanics' wages, \$4 per day, for every working day.

The Secretary of Agriculture, in his annual report dated November 16, 1896, says: "Science is constantly showing the farmers how to increase the annual product per acre in cereals and other staples, but the great question confronting each tiller of the soil is, how to secure satisfactory remuneration for the results of his toil." In other words, a crop well grown is half sold. Many of these vacant lot farmers are worthy of imitation, both as to growing and selling a crop. House to house selling, with only a basket on the arm, is an educator in the highest degree as to the demands of the various classes of consumers. I was standing at the table upon which the "Vacant Lot" exhibit was displayed at the American Institute Fair, when a woman came up. Ascertaining she was one of the exhibitors I engaged in a conversation with her. She had been growing vegetables for two years (1895-1896). She had a splendid show of first class vegetables, and was also an adept saleswoman. She had made a success of vacant lot farming, as she was a skillful grower and equally well versed in selling.

Time will not allow the setting forth of national tastes in grading vegetables that growers may realize the highest cash returns, yet reference to some of the vegetables as classified by writers on food and diet may be of benefit.

Spinach, a very fickle plant to grow, rapidly degenerating

in quality after picking, and one of the most difficult to cook properly.

Beet greens, dandelion tops and turnip tops are all very palatable, and if cooked tender and chopped fine are very wholesome articles of food for the relief of chronic constipation.

Green peas and beans, young tender beets, young carrots and green corn are highly nutritious and must be of good quality, as vegetables rarely develop more flavor while cooking. Turnips, parsnips, kohlrabi, salsify, cabbage, cauliflower and broccoli will preserve their freshness longer than those mentioned above and require more cooking. The greener asparagus contains more bitter and resinous principles than the white.

The potatoes, sweet potatoes, yams, and Jerusalem artichoke are all classified together.

Artichokes (French) are a variety of thistles and the cost in this country renders them a luxury.

Radishes, green peppers, capers, mint, parsley, chervil, endive, chickory and okra serve to stimulate the digestive secretions and give a fillup to the appetite.

Tomatoes, the uses of which are well known, should not be eaten in cases of gout, as the small quantity of oxalic acid in them aggravates this complaint.

Onions, garlic, shallots and leeks are edible as fresh vegetables, and after long keeping as condiments for flavoring salads, meat stews and other foods.

Celery is a wholesome vegetable when cooked in milk until it is quite soft, but eaten raw is stringy. Its aromatic flavor makes it very popular and it furnishes a useful addition to a light luncheon. It has acquired an undeserved reputation for use in rheumatism. Various preparations made from the plant are sold by druggists as hypnotics. They are of no value.

To us as horticulturists this vacant lot farming teaches valuable lessons.

Do not base cash returns from your products on those given herein, as your markets are further away.

Do not consider the largeness of the average returns have been augmented by consumers paying a higher price for produce from sympathy. This is not a fact.

The close proximity of these vacant lots to the cities enables the growers to dispose of the entire crop. They have no waste and have no expenses in providing other ways of disposing of what would be inferior grades of produce of more distant producers. Avenues of trade are open to them and close at hand for everything they raise.

They have no outgoes for expenses such as taxes, rent, plowing, fertilizers, seed, excepting ferriage, a few cents daily.

Their education begins on the land, continues after the separation of the crops therefrom, and they become adepts in the science of selling. They are pupils in the primary school of "Vacant Lot Culture." Yet in the course of a few years some of these will surprise many veterans in tilling of the soil, as these unemployed will have graduated from a kindergarten system of agriculture in which they have become educated from the planting of the seed, to the table of the consumer.

On motion a vote of thanks was extended Mr. Rogers for his address.

An adjournment was then taken until the following morning, January 7, 1897, at 9 A. M.

THURSDAY.

SECOND DAY:—MORNING SESSION.

The meeting was called to order at 9.20.

THE CHAIRMAN. The first on the programme to-day are the reports of committees. Have we any committee ready to report? Has Mr. Dye any report to make for the Vegetable Committee?

MR. DYE. I wrote Mr. Budd, the secretary, that I would be unable to attend to making a report, as my time has been so occupied in my duties as secretary of State Board of Agriculture.

MR. VANDERVEER. The Auditing Committee reported they had examined the Treasurer's account and find it correct.

The report was accepted and the committee discharged with thanks.

Special Committee appointed to examine the vegetables find it a very attractive display. Rural No. 3 potatoes, exhibited by Mr. Blackwell, are very fine.

On motion the report was accepted.

THE CHAIRMAN. We have a paper which was sent here by Mr. Green, who is unavoidably absent.

Mr. Rogers read the same as follows :

HELPS AND HINDRANCES TO FRUIT CULTURE.

BY CHARLES A. GREEN, ROCHESTER, N. Y.

This is the subject given me by the New Jersey State Horticultural Society.

The first help which occurs to me is the location of the fruit farm. A fruit farm need not be located close to a large city. My experience has taught me that a large quantity of small fruits can be marketed to farmers and villages. I have obtained higher prices in villages twelve to eighteen miles out of Rochester, than I could have secured at Rochester. I have found less competition in such villages than in large cities.

If you can locate your fruit farm near a large body of water, you will find such water protection of great service. As I drive towards Lake Ontario from the south, I often find no fruit until I get within two or three miles of the lake, the fruit blossoms inland having been destroyed by late Spring frosts, or by sudden changes during the Winter, which have not occurred along the lake shore.

It is a great help to have the fruit farm situated on an elevation and on rolling land, which gives free atmospheric ventilation, exemption from injury by frost, and a great help also is to have the fruit farm naturally fertile. At the present time we can buy rich soil cheaper than we can make poor soil rich by applying purchased fertilizers.

It is a great help to the fruit grower to have had business training, or practical business experience. The marketing of fruit, especially in seasons of great plenty, requires business ability. One trouble with farmers is that they often have had no business training, are unfamiliar with business, and therefore easily duped by swindlers. Such men suffer from lack of good business methods.

There are many hindrances, which are in a measure also helps, therefore I find it difficult to classify these two questions

under different heads exclusively. There is no doubt in my mind that the work of insects and fungus diseases, while a hindrance to an unprogressive fruit grower, may result in helping those who are diligent and well informed, by giving such progressive fruit growers almost an entire sweep of the markets.

I wish I could say that the result of bad packing and assorting of fruit was a hindrance that resulted in helping those who are efficient, but I cannot say that this results always in such a desirable manner. Western New York this season has harvested the largest crop of apples ever grown here. The average grading of this fruit has been done poorly. There are few men, even in this fruit growing section, who are capable of properly assorting a large orchard of apples, and placing them in market. If one man could do all the work it would be different ; but since one man must manage several, and all have not the ability to manage help, the result is disastrous to the majority of farmers, as they know little about the question of assorting.

What is the result of all this? Answer : The market is overwhelmed with apples that cannot be branded as good, or bad. Buyers at distant points who desire a carload of superior apples cannot send to Rochester or Lockport or Newark (N. Y.), for they suspect that they may get carelessly selected fruit, unless they happen to know some orchardists whom they can depend upon. Since they do not know any one they can depend upon they do not send their order, and this patronage is lost.

I know of two large apple growers, neighbors, the farms being divided only by the highway. One of these men assort his apples with the greatest care, rejecting at least half his crop as second class, selling that class for what it will bring ; while the other neighbor over the way is a poor grader, putting many apples in as first class which do not belong there. One year ago a Rochester buyer bought both these orchards

of fruit, and paid the same price for both crops. From that purchased of the good grader the buyer made a handsome profit; from that bought of the poor grader he lost money. This year he bought of the man who graded carefully, paying sixty-five cents per barrel, the lowest known rate at that time. He did not buy the fruit of the man who packed poorly, but that neighbor sold his apples at sixty-five cents to another man. Query: Does it pay to pack fruit properly in Western New York? My answer is, yes, it pays, but the man who carefully grades his apples should have the business ability to demand and secure a price worthy of his grading. This business ability the man who graded well did not possess. We should have placed the apples in our cold storage house, and sold for \$2 per barrel next May or June. The expense would have been forty-five cents per barrel.

I mention with considerable enthusiasm and confidence, as one of the help to fruit growers, the Agricultural and Horticultural press. Surely those who read the *Rural New Yorker*, *American Cultivator*, *Country Gentleman*, *American Agriculturist*, and many others of that class, must be aided in their work a hundred times more than the cost of these publications. These papers keep the fruit growers posted on the markets, on new varieties being tested throughout the country, or old varieties that are being discarded, and also give hints and suggestions in regard to methods of culture. But at the same time these journals are at times a hindrance to fruit culture. I am an editor myself. Some months ago I received a letter from a man on the Pacific coast, informing me that he was a reader of my paper, that he had followed instructions printed in my journal, and that thereby he had injured his orchard. I cannot now recall precisely what the circumstances were, further than the advice given was suitable only to a certain section of the country, such as the Atlantic coast, or something of that character. I wrote to this gentleman that I was grieved over his misfortune, and warned him that the man who

reads must be wise, in order to gather from that which he reads only helpful suggestions. Surely a fruit grower cannot follow blindly anything or everything that is recommended or suggested, in the agricultural or horticultural press. He must sort out the wheat from the chaff. There are many writers who have no experience, and their writings are simply speculations or theories. The reader must know something of the writer, if he is to follow his instructions. He must also know of what section of the country the writer is speaking, and of the various conditions.

No editor desires his readers to accept everything published in his paper as absolute facts, or as absolutely safe instructions to follow; therefore, since learning of this reader's misfortune, I have placed in a conspicuous place in every issue of my paper the following notice:

"This paper is not responsible for the views of its correspondents, hence do not consider that we agree with all our correspondents. There are many men of many minds, some right and some wrong. Do not accept opinions expressed in this paper, whether the editor's or others', if they do not appeal to your best judgment."

Our State Experiment Stations should be much more helpful than they are to the fruit grower. Fruit growers do not avail themselves of the advantages offered by these stations. During my visit to our station at Geneva, New York, I have been greatly interested and aided by visiting the experimental beds of strawberries. I have often seen as many as one hundred new varieties in fruit on the same bed, the same date. This gives one a marvelous opportunity for becoming informed in regard to the value of the newer varieties. The same is true of currants, gooseberries, blackberries, raspberries, of apples, pears, plums and other large fruits. On inquiring at the station if visitors were numerous, I was told that they were not, and that practical fruit growers were very seldom seen on these grounds. Of course the Experiment Station issues bul-

letins, which are helpful, but are not nearly so much so as would be a visit to the grounds during the fruiting season.

Another great help to fruit growers is occasional visits to other fruit growers in their locality, or in other states. I have never talked with a practical fruit grower, no matter how humble, without learning something. I have never visited a fruit farm, and walked over the place with the proprietor, without feeling repaid a hundredfold. But fruit growers are busy people, and seldom spend a day, or a week, in studies of this character. I am often asked by people of other states what to do or what to plant, but people of your own state should be better informed than any person in another state.

A fruit grower can learn much by going into the city markets where his fruits are sold, or those of his contemporaries, very early in the morning, and looking over the various loads of fruit, and questioning the men who are met with in the market, both sellers and buyers, and learning in regard to the most desirable packages, the most desirable varieties, the best methods of gathering, sorting packages, and marketing.

The United States Department of Pomology at Washington, D. C., is fully equipped for helping the fruit grower. Many people write me from various parts of the country, asking questions about insects and diseases, which I am not qualified to answer, since no one person can be an expert in every part of this great field. Many people do not seem to know that they, with others, are supporting some of the best experts in the country at Washington, whose duty and pleasure it is to answer such letters, and to give all the information in their power. It seems to be that it would be well for every horticultural society and every agricultural paper to call attention to the fact, that the government is supporting an institution of this kind expressly for the purpose of assisting farmers and fruit growers. I made personal visits to this department

at Washington, and have found the men very well informed ; each one a specialist in the department under his control. These men are affable and courteous, and none will call upon them, or write for information, without receiving prompt attention.

The last help which I shall allude to is the experiment orchard, or berry field. I have always been in favor of specimen orchards for both nurserymen and fruit growers. While I consider it a mistake for a fruit grower to plant a commercial orchard to a large number of varieties, I do recommend him to plant a specimen orchard, embracing one variety each of from fifty to one hundred varieties of several of the large fruits. This is not such a serious or expensive affair as would seem at first glance. I have planted at my farm several rows of trees, eight or ten rods apart, running the whole length or width of the field, embracing one hundred, or more, varieties of apples, etc. While these rows of trees are so far apart, the trees in the rows are planted very closely together, being not over ten feet apart, and in some cases not over five feet apart. One row thus planted will enable the proprietor, when they come in bearing, to become informed upon a large number of varieties, and he can never know much about these varieties and how well they do upon his place, unless he has experimented with them.

Trees thus planted together will yield several crops of good fruit before they become crowded, since the sunshine and air have full sweep on two sides. Later after the experiment has been made, the trees can be cut out when they become crowded. The same will apply to long rows of strawberries, raspberries, blackberries, currants and gooseberries ; one or two plants of each variety being enough to give a practical test.

On motion the paper was received and placed in the hands of the Executive Committee.

PRESIDENT'S ADDRESS.

THE CHAIRMAN. I have the pleasure of announcing that the President of this society is in the room, and I hope you will receive him by standing.

The President's address will now be read.

DR. J. B. WARD. This address has been prepared under difficulties. My mind has not been on this subject, still I have tried to do the best I could.

Mr. Chairman and gentlemen of the New Jersey State Horticultural Society :

In accordance with time honored custom, I present a few thoughts to your notice appropriate to the occasion. In the honor and the compliment you have conferred upon me, as your presiding officer, you will accept my thanks.

The past year has, I trust, left many a useful lesson in your minds and hearts—lessons which every conscientious man will ponder long and deeply, and which, if rightly improved, will make the labors of the coming year more successful, more of a blessing to this community, more honorable to ourselves, and still more efficient in hastening on the triumph of advanced horticulture in our beloved State.

The meetings of this society have always been eminently practical in their nature, and for one, I am far from regretting this. The short time that we can remain together would be comparatively wasted in lengthy papers or still more lengthy discussions. A free interchange of thought upon those topics which are of most pressing and present importance to us all, and a joining of hands all around our common altar. I do not regret that these are the objects of our coming together.

Again, there are so many Quakers—silent members—in our meetings. "How beautiful is silence," saith the poet. Yes, it is true, some of us might well study the thought, for

among us, too, have been too great talkers. Would it not be better to adopt a five or ten minutes rule, and let the president enforce it, calling upon each member in turn for an expression of opinion upon the subject under discussion?

Every man's experience is peculiar and his ideas consequently differ somewhat from those held by others. In such a meeting as this, therefore, no one should be wholly silent. Each should be a giver as well as a receiver.

Briefly written experiences, too, would greatly add to the interest and profit of the society. They can in this way be made much more concise and intelligible than verbal communications. Suppose each member present should pledge himself to bring to the next meeting of this society, a carefully written experience of something pertaining to horticulture, would it not add greatly to our profit? But I am not disposed to find fault, or to be much of an innovator. I have derived too much benefit from these meetings as they exist, to criticise them in any censorious spirit. Let us all strive to attend them, and each bring a neighbor, and some contribution to the common stock. Thus we may render our society so pleasant and profitable that no one of its members will be willingly absent.

It is a fact which cannot be disguised that as yet, as horticulturists, we are far less perfect than we should be. Our crops should be much larger, our whole system of fruit growing far more economical, and the profit of it largely increased. We cannot, however, shut our eyes to the fact that very great advance has been made by the horticulturists of our State, and no person conversant with the condition of fruit growing in this State twenty years since, and who has given attention to it during the past few years, but must admit that a very commendable advance has been made in every department of horticulture. But a much higher standard is yet to be secured, and we are encouraged from the improvements of the past to expect still greater advance in the future.

We want to increase the number of well educated and intelligent horticulturists—men who are in every respect as well qualified for all the varied operations connected with horticulture as are the men of other professions, who have been duly prepared for their pursuits. We want more men who with a full knowledge of the teachings of science, having also the teachings of actual experience, can thus apply their practical knowledge to far greater advantage.

We think that the number of those possessing in a good degree these qualifications are increasing, and as our institutions, designed to educate young men for practical pursuits shall be opened, we may confidently anticipate that New Jersey will, ere long, be furnished with a class of men to manage her horticultural interests, who will at least be equal to those of any other country. We, surely, should never rest satisfied with anything short of this, and if we do not greatly mistake the enterprise and public spirit of our horticulturists this result will most assuredly be secured.

In connection with this subject, we may properly direct the attention of our friends to the means which are in operation, to provide for all an education suited to their profession. Already many agricultural institutions are in operation, and in our own State we have one with which you are all familiar, where instruction and practice combined will be given, from which we may reasonably anticipate the most favorable results.

I think I am not giving too much stress to the educational features of our calling. All that our country needs, with her vast untested capacities, in order to exhibit the most prodigious results in agriculture that the world has ever witnessed, is knowledge penetrating deeply, and disseminated universally, among the rural population. It cannot be denied that in times past the most moderate talents and little intelligence were deemed adequate for the tillage of the earth. The farm laborers of continental Europe live in the same cottages—often in mud cabins—without furniture, and plod along in the same

track as their forefathers. They cling to gross superstitions and ancestral usages and scorn books and instruction.

In many portions they persistently draw the plow with ropes tied to the horns of oxen, and gather their grain with the sickle. The pervading sentiment among the greater portion of our farmers in regard to the dignity of their calling and the knowledge required for its pursuit is humiliating.

Farming communities are decimated of the boys of most active intellect, sent off to city or college, to follow other pursuits more respectable in the apprehension of the family. As surely as in ancient times feats of valor and of arms being alone the theme of song and story, and winning alike the smiles of beauty and the applause of the powerful, sifted the masses of genius, energy and courage; so in modern days the brilliancy of great fortunes and professional renown have attracted a large portion of its capacity and energy from the rural population. The victims are, it is true, tempted by a siren's song. Ruined health, doubtful reputation, bankruptcy and sometimes crime, tell the sad story of regiments of infatuated men. The aspirations of few are realized, and to them life loses its zest before ambition is gratified. Go into a public assembly, and if the speech is dull and stupid, ten to one the farmer who stands next to you will declare that the speaker had better go back to the plow, or the jack plane, thus acknowledging that inferiority of talent is sufficient for his own noble calling.

We have just passed through a great political campaign. The cities and villages have been ransacked for orators. They have been sought for among lawyers, doctors and politicians. Each pursuit should furnish its own teachers, its own prophets. If, perchance, a farmer here and there has ventured to address his brethren, to tell stern truths in his plain and homely way, farmers will be the first to abuse him for his temerity, and pursue him with the most uncharitable criticism. Such are

some of the evidences of the degraded estimation too often placed upon their avocation by the farmers themselves. If there is any pursuit which demands for its most successful prosecution acute powers of observation, comprehension, intellect, and most abundant and varied knowledge, it is that of the farmer.

There is scarcely a science that will not shed a flood of light along the pathway of the farmer, and a knowledge of the practical arts and trades of life must constantly aid and relieve him. So thickly do objects of interest and study cluster around him that if an enthusiast he might exhaust a lifetime on his own farm in pursuit of a single science.

The horticulturist's principal vocation is to deal with vegetable life. The assumption is that he knows all about it, when in fact he knows very little. His knowledge is arrested on the very threshold he desires to cross. The mysterious agencies by which the plant is invigorated, and by which it converts into grain, fruit and vegetables, its invisible and intangible food, are beyond his control. An endless field for scientific research is here opened.

Botany will constantly illustrate the pursuit of the horticulturist. I need only call your attention to the subject of hybridization of plants, by which new varieties are multiplied. The display of flowers so multiform and gorgeous, one sees all about him, only attest how much our gardens, parlors and tables owe to science in this department.

Chemistry, perhaps, of all the sciences, is that which will aid you most. Its analysis will show the constituent parts of animal and vegetable matter; it will eliminate from the fibrous the nutritive portions; it will prove which are the most profitable, and in many cases which are the most healthy productions; it will compare different grains and tell you the relative portions of gluten, starch, oil, albumen, water, potash, lime, etc., contained in each; it will disclose which grain possesses most of the elements conducive to the vital heat of

the animal, which contains the most fattening material, and which will build up most rapidly the muscular system.

The study of entomology, with the aid of the microscope, is destined to prove of great value to horticulture. Every leaf, every animal is covered with parasites. Insect life crawls and flies everywhere; it is visible and invisible; it is a protective sentinel, or a destructive pest. Some insects live by the destruction of our crops. Some are predatory and live on insects, or the eggs of insects most noxious to man. Each crop, each fruit has its peculiar enemies in infinite variety. Therefore the functions, habits and food of insects are important subjects of investigation.

We thus see not only the wisdom in establishing but the importance of maintaining our experiment station, and giving all the aid that lies in our power to the able corps of professors who are laboring so earnestly and diligently in our behalf.

In a late number of the *Farm News* we find the following: "More and more is agriculture looking to science as the source of its salvation. It is largely because agriculture has not kept pace with the other arts in scientific development that it finds itself at such disadvantage to-day. There have been, it is true, great advances made; crops are planted with a much greater degree of certainty, and are brought to maturity and converted into cash with a much less expenditure of human brawn than ever before, but compared with the advances resulting from the adoption of scientific methods in the mechanical arts, where steam and electricity are called into service, and a thousand products of human ingenuity are employed, agriculture's advances are as nothing," as the *Farm News* concludes. The truth is that we are only beginning to have a scientific foundation upon which to stand.

The whole theory of plant growth has only recently been revised, and we have as yet only begun to adapt our methods to the new theories.

It is only twenty years since the first agricultural experi-

ment station was established in this country, and less than half a century since the first one in the world began its work at Leipsic, Germany. Prior to that time but little scientific attention had been given to the cultivation of the soil, so that the results accomplished in these few decades are nothing less than marvelous; and the results are the more encouraging from the fact that in almost every department of the work they are basic; the discoveries made, the results obtained, give foundation for future work along the same line. Take for example the work of the bacteriologist. A few years ago their work was confined almost exclusively to the study of bacteria injurious to plant and animal life. At the present time much more attention is paid to the bacteria useful to the processes of growth. Dairymen purchase in the open market a pure culture, "B 41," for use in refining cream. And now experiments of even greater importance are under way—are, indeed, all but successful—in which the fertility of the soil is preserved and even created by inoculation with a bacterial culture.

The outcome no man can guess; but it is certain that agriculture, as well as every other occupation that employs the time and energies of man, has illimitable possibilities before it. Mistakes will, doubtless be made. Enthusiasts will be led away by half truths, and theories untried; but every year will bring us nearer perfection.

The past year has not been a profitable one to the majority of fruit growers. Late in April more than a week of unprecedented warm weather advanced vegetation, swelling the buds so that in many cases the bloom appeared, followed by a cold, damp atmosphere, destroying many of the buds, so that but half a crop of many varieties was the result, while fruits like the cherries were a total failure throughout the State.

From these losses many lessons may be learned. Where there was but a small portion of the crop left many thought it would hardly pay to spray. The result was more than half

the fruit remaining upon the trees was badly deformed from the stings of insects and fungus growth, making it unmarketable, consequently worthless, to say nothing about the foliage, which was in like manner injured. Lessons to be learned: spray, even for half a crop, or even for no crop at all.

The low price of fruit, even with a partial crop, save early apples, has had a most discouraging effect upon fruit growers. This with the increased ravages of insects, even to the total destruction of entire orchards, may well cause the tiller of the soil to stop, consider and wonder what is coming next, and yet with all the disheartening and unlooked-for results, he who will follow with a progressive spirit, one who will keep abreast of the times, will apply his well directed knowledge, will surely succeed. But to succeed old ways must be abandoned. Intensive horticulture must come to the front. It must be our aim to make two superior blades of grass grow where but one had grown before.

We, as horticulturists, should discourage the oft-repeated idea that any one without experience or qualification can succeed as a fruit grower. They may, after years of failure, which are to be object lessons to them, but the experience will be dearly purchased.

As a society, we should endeavor to instil a more correct taste among the rising generation.

Teach them to love the beautiful. Nature, on every hand, is giving us object lessons. Let us profit by these lessons. The observance of Arbor Day is doing something for us in this direction, but much remains to be done.

As I have said before, we must turn our attention more and more to more intensive farming. Persistence and concentration should be our watch-word. We have a good object lesson in a scheme introduced by ex-Mayor Pingree of Detroit, now Governor of Michigan, known as "Farming Vacant Lots."

On some of the Long Island lots last year many of the

people averaged four dollars a day for their labor. It is true they had no rent to pay, and they were right at the doors of a market, points in which they had an advantage over regular farmers. On the other hand they had very limited areas of ground to work, and many of them had to get their first experience in the efforts of the year. It would be strange if, in these days, when farmers and gardeners are having so hard a time, and complaining with such sadly abundant reason, of their inability to make their livings, they should get real lessons in agriculture from people situated like those who have been given a chance to farm unoccupied city lots.

This subject is of so much importance that it will be treated more at length by a paper which has been prepared by one of our members.

In conclusion, would say to the members of our society, let us by our example show that whatever is worth doing is worth doing well, that one acre well tilled is worth two acres half tilled, and from this we draw the conclusion, never attempt to do more than can be done well. Let us use our talents so that you may hear from your friends and neighbors the welcome plaudit of "Well Done." And when you have entered into that rest which God has prepared for those that love Him, man will rise up and call you blessed.

Address received and placed in hands of Executive Committee for publication.

President Ward then called Vice-President Nicholson to the chair who continued to preside during remainder of session.

ORNAMENTAL FLOWERS AND PLANTS—THEIR CARE AND CULTURE.

THE CHAIRMAN. We will now have an address by Mr. W. A. Manda who is known as one of the largest palm growers in the United States. Probably some of the lovers of palms

can learn something by which they can have some of these tropical plants in their house.

I have the pleasure of introducing to you Mr. W. A. Manda, of South Orange, Essex County, N. J.

ADDRESS OF W. A. MANDA.

Ladies and Gentlemen and Members of the New Jersey State Horticultural Society :

Through the invitation of one of your members I have consented to come to your meeting to-day and give a few words on Floriculture, knowing well that my deficiency as a speaker will be kindly overlooked and that you will give me your attention for the few minutes I will address you.

Floriculture, or everything pertaining to raising plants and flowers that are more for beauty than for practical use, is simply an extension of a branch of horticulture, which in its turn is nothing but a branch of agriculture. After a country becomes settled and the necessities are provided for, the inhabitants begin to look for luxury and beauty, then families find it very beneficial to beautify their homes and surroundings with ornamental trees, shrubs, hardy and flowering plants, and they can have a little greenhouse or conservatory with palms, ferns, foliage plants or anything they choose to grow. It seems to me this country is drifting too much into specialties. It is true that to succeed in certain lines a man has to devote his entire time and energy to certain productions which are best suited to his climate, soil and surroundings; yet on the other hand we are lacking as yet in the general assortment of this ornamental stock. We find out that thousands of dollars of stock is annually imported from Europe and the reason why it is, is not because the stock is better; it is simply because the stock cannot be procured here and is in demand. You cannot induce people to buy or ask for anything they have not seen. You must grow it first and show it to them and then you will find customers. It is the

same with all classes of plants. Take the orchid. Some twelve or fifteen years ago you could count all the orchid growers on the fingers of your hand ; to-day there are more than that many hundred. It is more or less expensive and requires the hot house to grow them. Their wide distribution is brought on simply through their culture and exhibition and bringing them before the public. You need not go very far in this city, to the house of Mr. Charles G. Roebling, of Trenton, who undoubtedly would be pleased to show you his greenhouses which are not surpassed in this State. I think one reason why a larger variety of stock is not grown is owing to the lack of training of the men engaging in the business. It is true if you wish to grow peaches you must learn all about peaches, and I do not see why you should not gain a knowledge of the nursery trade in general and also of plants. In the same way while you are at school, you learn all the branches that are taught and then select the one in which you wish to perfect yourself.

In the great competition there is in a good many lines, the attention of the owner of the nursery is so absorbed that there is not enough time and importance given to raising new varieties or experimenting with stock which might be not only of a great benefit to the owner himself but also benefit the whole nation, for I claim that a man who will raise a new and superior variety of fruit, plant, or anything else that will benefit the whole nation not only now but in the future, is worthy of a larger monument than the greatest general who has slain his thousands.

There is not remuneration enough in our line of business. We are deprived of the privileges of having a patent. You cannot patent your novelties like one who invents a new machine or appliance of any kind. Unfortunately our business is not looked upon in the same light as other professions that are not of so much benefit to others. For instance, take the lawyer or the doctor, and when you simmer it down you

will find that they both simply live upon the misfortunes of others, while our profession will aid in making life more happy and pleasant and provide not only for the necessities but for the refined tastes of those who can appreciate the beautiful in nature. Take a country like this with its vast expanse of territory, from the tropical coast of Florida to our everlasting ice and snow, and from the Atlantic to the Pacific, you will find spots and places where you can successfully grow anything that is imported to-day from Europe. It is well to take interest in those lines and give our energies to the ones that are remunerative and thus save millions of dollars from going abroad every year. We can grow bulbs as well here as in Europe. We cannot of course grow them in one place, but some in Florida and others in California, just as well as in Europe. All we need is experimenting and trying. I think that if all engaged in horticultural pursuits would take plants and watch their growth, they would find some place in which they can be successfully and profitably grown.

Another drawback why floriculture is not advancing with more rapid strides than it has been is owing to the fact that it is hard for the producer to reach the buyer. The nearest approach to it is the nearby florists; they do not wish to be bothered with plants, trees and shrubs, and for that reason people do not patronize home trade. They go to New York and buy plants at auctions that are grown under different conditions than those raised here, and then when they die they give it out that they cannot be grown here. If you will study the growth of nursery stock in other countries, and especially in Booskop, Holland, you will ascertain the different conditions under which those trees and shrubs thrive. Booskop is about forty feet below the sea level. They have to pump the water out and send it back to the sea and should the dykes break the whole country would be submerged. If you examine the soil there in some sections you will find it only from nine to eighteen inches above water level. Naturally the plants

raised there will make quick roots and fine growth. Now take that plant and plant it near a house situate on a high hill, the plant will die because the root is accustomed to excessive moisture and it does not find it there.

Another thing is the abuse of agents. While in one way they are necessary evils, yet in another they mislead the people by their highly colored pictures, and when the stock is sent to the parties, they do not know how to plant it. If in the place of that, the nurseryman could make arrangements with a local florist to take charge of his plants, the customers would learn more about it and be pleased with the stock and it would be more apt to flourish. Especially of late years people are moving out of the crowded cities into suburban homes, and I think it is the duty of every man to take his family out in the country as much as he can. Take the most successful business man and men of brains and you will find that ninety-nine per cent. of them have been raised on farms. They were country boys. It is a mistake that people who live in suburban towns do not buy more land. They purchase a lot 25 x 100 and think it is a large one. I think it would be wiser to put more money in land and build a smaller house and then add to it later on. You cannot always buy the land, neither can you add to the house after your neighbor has bought the next lot.

Another thing is that the residents of every village should do their utmost to establish a village improvement society, that is a society to look not only after the town affairs but also to beautify the town, so that visitors would not only be pleased by its appearance but it would act as an inducement for the people to come and settle there. You, as a rule, in approaching some of the very finest country villages, see nothing perhaps but a coal yard, a few tumble-down shanties, a saloon and so on. I think after a village is started bonds should be issued and all undesirable property bought and a square made

of it, and the balance left sold for residential or commercial purposes; thus it would pay for itself ten times over.

I think every resident in any village should keep in mind the idea of making the place as ornamental as he possibly can.

Raising plants and flowers is just as easy as raising any kind of crop. If you wish to make a success of raising plants and flowers you have to study their nature and attend to their wants and you will be repaid by an abundance of bloom or a beautiful growth of foliage as the case may be. I think there are more plants killed by too much kindness than too great neglect. In the city where plants are kept in houses you will hear the ladies complain of their dying. The trouble is the ladies leave the care of them to the servants, who have to clean the plants and they know the quicker the plant is dead and out of the way the better it will be for them, with less care.

It is gratifying, however, to see the number of plants bearing flowers and foliage in houses. I recollect some fifteen years ago the only city where I saw plants in the windows was in Philadelphia. I saw some hydranges and a few palms. Now you can go anywhere and see the windows, especially bay windows, full of flowers, and I think the more successful they are in raising them the more you will see of them, the more they will buy. People generally say if they buy one and that dies they cannot possibly raise another one in that house.

The best house palm is the *Hentia* palm. It will stand any temperature from forty degrees up as high as you give it, providing you give it plenty of water at the root and plenty of light. The rubber tree or *Ficus* is a good house plant also, but it is a little more difficult to keep. The *Arancaria* or the Christmas tree is another excellent house plant and should be kept as cool as possible, and it will thrive for years and years. Plants can be grown in ordinary dwelling houses just as well as they can in a greenhouse, if they are properly attended to.

Of course in a greenhouse there is considerable moisture that the plant gets. Once or twice a week the palm leaves should be sponged with water and when there is a nice warm rain let it stand outside and get its leaves washed off. I think that by judicious planting of hardy herbaceous plants you can have flowers from the early spring. You can get the moss pink from the time the frost leaves the ground and have a continuous bloom by proper selection until late in November. I have seen *Helianthus Maximiliani* on the fifteenth of November in flower, whether we had frost or not. It is a class of plants that when once planted with a little care will thrive from year to year if kept well cultivated. Make the country as beautiful as it can be, as a fine garden to my mind is far prettier than anything you can have in your house. You may go and buy a handsome picture and there it is the whole year round. If you have plants in your garden you will find changes in them every day in the year, new leaves coming out, new buds and blossoms, something to attract you and make your life more pleasant and happy. Plants in the past were looked upon as a luxury, now more as a necessity, and I hope that in the future our homes will be just as pretty as those you find in England. In London you will find the windows filled with flowers and plants and the grounds full of hardy plants, and in the rear of the house a nice vegetable garden. It is true you can often buy vegetables much cheaper than you can raise them, but they do not taste as nice. When you raise them yourself they are much fresher and sweeter and you can have them when you want them. I think ladies should take more interest in raising plants and flowers. It is not hard work and it is a pleasant and healthful occupation. I think if the ladies of this land would spend more time in their gardens they would find it to be a very pleasant and healthy occupation. Statistics show that the florists and gardeners have the longest chances of life next to the clergyman, and strange as it may seem the doctor's chances are

fewer, being next to the rum seller, which is accounted for by his exposure to different diseases with which he comes in contact and the restless life he leads, being called up at any hour of the night. I had occasion once to be present where they were having a little fete and were distributing flowers I presented. I watched those present who had been a rather degraded class and saw the lunch, ice cream and cakes spread before them, yet as soon as they caught sight of the flowers, they left the ice cream and were kissing and hugging the flowers, these reminding them of their early childhood. I think we should interest the children more in the study of flowers.

I would say in conclusion that I should like to see horticulturists in closer union with florists and the other branches of floriculture. I think it is a mistake that we should pull apart. I think there should be a grand society with a flower department, rose department, carnation department or anything else that is of importance enough to have a special committee to look after it, but make it one body. It does not make any difference whether men grow cabbage or an orchid, they are horticulturists all the same, and have common interests. Coming in contact with each other we could assist and learn one from the other, and although I am not a grower of nursery stock to any great extent, I take just as much interest in a vine, fruit or vegetable as I do in fine flowers or orchids. That was my first training. I worked in a vegetable garden the first year. The second and third year in the greenhouse. I hope at no distant day we will have one grand society, which will have the help of the government, (no free distribution) whose reports will be published by the Secretary of Agriculture, and have a home the centre of which would be in Washington, with meetings in different parts of the country, and then coming all together have grand meetings, to learn from each other, help each other, and work in a common cause. When horticulture shall include floriculture it will benefit more than in any other way.

Ladies and gentlemen, I thank you for your kind attention.

On motion of Mr. Nicholson a vote of thanks was tendered Mr. Manda for his interesting and instructive address.

MR. JONES. I think Mr. Manda is a good authority for information and all he needs is questioning to get a good deal from him. Any one can learn a great deal about palms.

THE CHAIRMAN. Has any one any question to ask Mr. Manda in relation to growing plants?

MR. BEEBE. What is a good house plant?

MR. MANDA. The Kentia palm is by far the best house plant. Raphis palm is a good house plant, but is a slow grower.

MR. BEEBE. Can you recommend anything better for table decoration than Cocos Weddelliana?

MR. MANDA. Yes, there are other plants with decorative leaves, but the stock is limited and so expensive that it cannot be used for extensive decoration. Livistonia is a good plant if it is grown properly.

MR. BEEBE. It is pretty high priced now.

MR. MANDA. A good many of the growers have no consciences. They try to get a palm a certain height and they keep the temperature in the greenhouse at seventy-five, eighty or eighty-five degrees, and after it has endured that temperature for six months and then taken out and kept in a house at an ordinary temperature it dies.

MR. BEEBE. At what temperature should ladies keep plants in the house?

MR. MANDA. Temperature ranging from forty-five to sixty-five degrees is the best for growing plants in the house.

In my own greenhouse I let it go down to 40 and 45 on cold nights. I find it is more beneficial to the palms. It gives them a rest. They will make up for it by a strong and vigorous growth in the summer. Our tropical plants have rest when the dry season comes and it is unnatural to keep those plants forced and growing continuously all the year around. It is the same as if you were to take an apple tree and try to keep it in leaf all the year. Plants should have a season of rest.

MR. BEEBE. How about feeding them ?

MR. MANDA. I do not believe in anything but natural manure, and the kind I recommend is sheep manure. It is stronger and you need not use it in such large quantities as cow manure. Another stimulant that is very good is pure bone, but would advise only the use of coarse ground. Never buy fine ground bone because plaster or many other articles can be substituted for it.

MR. BEEBE. Sheep manure you use as a liquid ?

MR. MANDA. Yes, mix it with the soil. As a liquid I think it is the best of anything I have ever tried.

PROF. HALSTEAD. Mr. Manda's address was excellent and he is improving all the time. Now we have the bride and bridesmaid rose, and I would like to have Mr. Manda tell how the bridesmaid came out of the bride ; also how we get new carnations.

MR. MANDA. In reply to that I would state that both the bride and bridesmaid were sport from Catherine Mermet Rose, the cuttings taken off and perpetuated. There are very few roses raised from seed. I think it is a shame that florists cannot devote one greenhouse to seedlings. I think there has been more made from carnations of recent years than other flowers. We certainly have carnations that cannot be sur-

passed either in Europe or elsewhere. They have been raised from seeds and there are thousands of seedlings that are being experimented with. I have seen carnations 4 or 5 inches in diameter, but it is very hard to get a carnation having a sealable color; the next thing is to get a calyx that will not break. Fragrance, I am sorry to say, is being lost in the carnation. Like fruit, some are very nice to look at but have not the eating quality of the old fashioned kinds. It is the same with the Chrysanthemum. It was brought to perfection in this country. We can produce them now superior to Japan, the home of the chrysanthemum. The Japanese idea of beauty is different from ours. Their idea of beauty is to have very long threaded leaves, while we prefer the perfectly double globular flowers.

THE CHAIRMAN. I take the pleasure of introducing to you Mr. Farmer. He will give you some points about the latest culture of strawberries.

THE NEW STRAWBERRY CULTURE.

BY L. J. FARMER, PULASKI, N. Y.

The man who engages in the strawberry business to-day must face different conditions than he would have had to ten or fifteen years ago. There have been great changes in the methods of carrying on the business during these years. Some of these changes operate to make the business easier, others to increase the difficulties.

One of the great changes has been in varieties. If we would keep pace with the time, we no longer cultivate the old Wilson and Crescent. These varieties would be all right were it not for the fact that a few enterprising growers started the ball rolling by placing on the market larger and finer varieties. The fact that no two growers give exactly the same culture, nor plant on the same soil, will prevent any variety from be-

coming the favorite of all, and always make the question of proper varieties an all important one.

For years and years there were two distinct classes of strawberries. The one represented by Crescent was very productive under ordinary circumstances and on most soils; the other represented by Sharpless, a failure on light soils and under poor culture, requiring strong soil and high culture, where it produced the finest specimens, large and fine flavored. Whenever varieties of the Sharpless type were placed in market alongside of Crescents, the latter had to take a second place. The fact that Sharpless were so much more costly to produce (you could grow five quarts of Crescents almost as easily as one quart of Sharpless) prevented varieties of the Crescent type from being driven from the markets.

During this time there have been innumerable crosses of the two types and we now have varieties that unite the large size of the one with the ability to stand almost as much neglect as the other. This has had the effect, in a great measure, of driving the smaller varieties from the markets. The Bubach was the first great strawberry that was at once large and very productive and it marks an epoch in strawberry culture. Since the advent of the Bubach there have been many others of its class put upon the markets, with various desirable qualities, in some respects surpassing that famous variety, in others inferior to it. So long as men try to get ahead of their competitors, by placing on the markets larger and finer colored varieties, the novelty craze will not abate. The idea is a good one when not abused, but nurserymen should not be allowed to re-introduce already well known varieties under a new name, nor palm off worthless new varieties for a big price. There should be some systematic method for testing a new variety before it is introduced. Possibly the best way for us to do at present is the way that has always been the best. Invest in a small way, in those varieties that have

been tried and reported upon favorably by private experts. There are a number of them in this country and they are generally honest. It has always been a pet idea of mine that there should be a man in every fruit section that took enough interest in the new fruits to test thoroughly all that came out. To him beginners and others could go for advice. As varieties vary so much in different sections of the country, his researches would be of great benefit. For his remuneration, the sale of plants ought to be sufficient. In localities where this person does not exist, the best plan is to purchase a few plants, say half a dozen of the well recommended varieties, and each year test them ourselves. It does not cost much and the benefits derived are often great. We miss sometimes, but oftener we hit and no matter what the result, it is absolutely necessary, if we would keep up with the times.

While the size and marketable appearance of varieties has been greatly improved in the past 15 years, it cannot be said that the flavor has been greatly enhanced. The poor quality of our large market strawberries is notorious. It is along this line that the successful strawberry grower must work in the future. Competition is keener each succeeding year and the fact that larger and more attractive berries are driving the smaller ones out of the markets, proves that the finer flavored varieties must ultimately drive out those lacking in this quality. For the same reason that a customer would refuse a quart of Crescents for a quart of Bubach, when they were shown on the stand side by side, would he refuse a quart of Bubach or Edgar Queen for a quart of Sharpless, Jessie or Marshall, had he once tasted these latter varieties?

This suggests another line of thought. There is no doubt that the finer flavored berries help future sales, while the poor flavored berries hurt them.

I may truthfully say that it has always paid to grow the finer flavored varieties when one has the right soil and gives the necessary careful culture. There are always people in

every market whose tastes are delicate enough to appreciate quality and who are willing to pay fancy prices. While under ordinary circumstances these fancy varieties are a failure, or nearly so, when placed under the careful care of an intelligent expert they respond wonderfully. He studies their likes and dislikes, selects the right soil and location, drains the land, prepares it in the best possible manner, finds out the needs of the soil and fertilizes in a scientific manner, gives the most thorough cultivation, mulches for winter protection and in the fruiting season for keeping the berries clean and to conserve moisture, irrigates if necessary and even shades the plants, to secure exhibition specimens.

The proper thing at the right time is done and I will say that the knowledge necessary to do this does not come in a day nor in a year. The successful strawberry expert has made it a life study. Probably the most successful fancy strawberry expert of the United States is Mr. E. C. Davis, of Massachusetts. He succeeded in producing specimens of the new Margaret strawberry, three and one-eighth inches long and three and one-fourth inches in diameter. Possibly the average grower would not produce as large a crop nor as large single specimens of Margaret as of Bubach, yet with his skill, Mr. Davis was able to produce a crop so large that he dare not measure it for fear the public would not believe him. In our locality, Oswego Co., N. Y., there is a variety grown, the Atlantic, which is in great demand for its beautiful appearance and unsurpassed firmness. The average grower makes a dismal failure with this variety, yet there are a few men whose skill enables them to produce large crops of Atlantics and they are always well rewarded. The past year when the highest price received for Bubach and other berries of its class was \$5 per 36 quart crate, Atlantics sold day after day for 20 to 25 cents per quart, or \$7 to \$9 per crate for shipment to New York and Philadelphia.

IMPROVEMENTS IN CULTURE.

There have been great changes in the care of strawberries during the time mentioned. Farmers now see that as this is to bring in more money than any other crop planted on a like area, it is economy to select the best soil and as near the roads and buildings, as possible, to facilitate in hauling fertilizers, caring for the plants and gathering the crop. Care is taken to prepare the land thoroughly by growing hoed crops, such as corn and potatoes, three years previous to setting out the plants and giving clean culture, thus ridding the soil of weeds and grubs. Thousands upon thousands of dollars have been lost in the past by setting plants on soil infested with white grubs, the damaging effects of which can only be avoided by thorough tillage of the soil for three years previous to setting out the plants.

As strong soil with a good bottom produces the best results and as such soil is naturally too wet, artificial drainage is resorted to, thus removing the water, livening up the soil and letting in the air, in order that the innumerable bacteria, so necessary to break down the rude elements of fertility and make them available for the use of crops, can work and accomplish the necessary results.

It is along the line of culture that I have a new idea which has proved of great value to me in growing strawberries and I give it to you here.

The usual practice among strawberry growers has been to plow the land early in the Spring, and set the plants as soon as they could be gotten into the ground. This method had the advantage over waiting later. The plants were handled in a dormant condition, and set out in cool weather on moist soil before the little tiny rootlets had time to start. The results when the patch was well tended were to secure a good crop of vines by Autumn and a good growth of fruit the following summer. The disadvantages I will enumerate later on.

By "The New Strawberry Culture" we take the plants up in Spring at the usual time, early in April in our locality, and set in beds close together. Trenches are made about seven inches deep with slanting sides and the plants are placed against the embankment, the crown on an even with the surface. The plants are spread so that each one reaches the soil and is by itself. Then the soil is hauled up to them, filling the trench. About fifteen to twenty can be placed in a linear foot. A good plan is to have three trenches close together, say about eight inches, and between this set of trenches and the next set of three, have a path to facilitate getting around in watering and otherwise caring for the plants. After the trenches have been filled, a mulch of fine straw or manure can be placed in the path and between the rows in and around the plants, so as to shade the soil entirely. This mulch conserves moisture and prevents the soil baking and is very necessary when the plants are set so closely together, as one will find by experience.

After the plants have been set in the trenches and mulched, the whole bed should be thoroughly wet down. Afterwards it should be watered when necessary to keep the plants from wilting and in a growing condition. At intervals of about a week apart, the plants should be sprayed with Bordeaux mixture to prevent the growth of blight and mildew fungi.

When the plants have been in the beds about six weeks, about the first of June in our locality, we take up in pans and transplant to the field where they are to remain permanently. New roots have grown laterally from the old roots all along down, which holds the earth together in a clump. Thus they receive no check in transplanting and grow right along, making, if they been carefully treated, as good a growth as plants set early in April by the old method.

While the plants are being carefully treated in these beds, the land that they are to occupy permanently is receiving a thorough preparation. It is plowed early, harrowed and

plowed and harrowed again and again, until in perfect condition. This constant cultivation puts the soil in excellent friable condition, enables the bacteria to get to work and carry on the process of nitrification, sprouts and destroys weed seeds, and brings to the surface most of the grubs where the poultry and birds can destroy them. The cultivation after the soil has been thoroughly plowed should be very shallow and this is best accomplished with a smoothing harrow or Breed's weeder.

The advantages of this method over the old way are that it saves labor. The plants have to be hand-hoed and cultivated six weeks longer by the old method, and every berry man knows that the first six weeks of the season are the most costly. The weeds are sure to grow even if the plants do not. The land can be more thoroughly fitted, weeds destroyed and grubs killed. Everybody knows that it is impossible some times to properly fit heavy soils very early in the Spring. It is absolutely essential in these days to spray with Bordeaux to destroy blight and mildew, if we are to produce the largest crops, and this can be done much more economically and thoroughly when the plants are in the small beds. It would cost much effort to go over an acre or so of plants once a week for a month and a half, but these same plants when set in the beds closely together, can be sprayed readily and in a very few minutes.

When plants are set out very early in the open fields they often remain for some time at a stand-still, because the land is not in a growing condition. But when set out the latter part of May or first of June, the soil is in the most favorable growing condition and the plants boom right along receiving no check. This is the time we plant corn, tomatoes and other crops that we want to grow right along without stunting, and for the same reason, why not set our strawberry plants out at this time?

It is not advisable to keep the plants growing in the patch where they grew the year before and transplant only once late

in the season, because when left to themselves they make a growth of feeding roots early in April which are lost in digging the plants. Whereas if transplanted before the growth is made, the change of environment causes them to send out a set of roots that hold the soil together, and which are tougher and do not slump off when taken up from the beds to transplant permanently. Then, too, by transplanting early the foliage is not so luxuriant and does not have to be cut off as it does when taken late from the old beds of the year before. Of course when the plants are set in the small beds the roots are trimmed and when set out for permanent culture they should be thoroughly wet.

By this method, those who are rushed with spring work can have their plants early in spring as usual from the nurseries, and with little effort trench them in so they will keep growing till a more opportune time comes for setting them out permanently. When plants come from the nurseries the season is not always right, the soil may be too wet or as is often the case, it may be too dry and some other work is pressing. If we wait for the right time to come the plants often spoil before we are ready. In our locality the farmers are over the rush of their spring's work by June 1st, and as the season is earlier down here I suppose your farmers would by that time be ready to plant strawberries here. One man can trench in properly 10,000 plants in a day, whereas it might take a week to set them permanently. In this time some of the plants would spoil and he would be prevented from tending to other work. This and the careful preparation of the soil, killing weeds and destroying fungus diseases make the new method a great improvement.

This plan does not interfere with the usual methods of cultivation. The Breed's Weeder and narrow toothed cultivator can be used after the plants are permanently set in the field. In using the weeder it is best at first to remove the outer sections and go just between the rows until the plants become

thoroughly rooted. Then the sections can be put on and the weeder run over the rows, plants and all. This weeder is a great saver of labor, enabling the operator to stir the soil close up to the plants, killing the weeds very easily and creating a dust mulch to conserve moisture. Whoever has used the old style cultivator of 20 years ago cannot help seeing a great improvement in the narrow-toothed adjustable cultivator and Breed's Weeder, now used by the modern strawberry man.

AS TO FERTILIZERS.

The old method of fertilizing was to plow under a good coat of well rotted manure and scatter a few ashes over the field, if we had them, without consulting in any way the actual needs of the soil. As a result the crop was sometimes good but not always safe, and often poor colored and soft. Many times the superabundance of nitrogen in the manure led to an abnormal growth of foliage and very little fruit. Now the successful strawberry grower studies his soil. If by the growth of plants he thinks it needs humus, he applies it in the shape of animal manures and green crops plowed under. If it has too much humus, he applies lime which eats up the coarse fibre and puts in shape the fixed elements of fertility so that the plants can appropriate them.

If the growth is weak he applies some form of nitrogen, which causes a rank growth of plants and large berries. If the berries are ill-shapen, caused by the improper development of the seeds, he knows that the soil lacks phosphoric acid, therefore he applies it in bone, dissolved rock or some other form. If color, firmness and the fine glossy appearance in the fruit, vigor and stockiness of plants and fruiting stalks is wanted, the successful, up-to-date berry grower applies large quantities of potash in some of its various forms.

AS TO CRATES AND BASKETS.

In the use of crates and baskets for marketing, we have gone by a series of rapid and continuous improvements,

through a series of evolutions from the heavy and expensive boxes and chests, which weigh several times as much as the fruit, to the light, airy and comparatively inexpensive crates and baskets used at the present time and given away in most cases with the fruit. There are several styles of crates and baskets or boxes used in this country, and it would be better if growers could agree on some particular style. In Oswego county, N. Y., we use a crate holding thirty-six quarts. The baskets are given away and the crate returned. Our berries do not sell as well in any other package on the New York market, which will prevent for some time the change to any other style of package. I prefer the style used mostly along the Atlantic coast; viz.: the four tier thirty-two quart style. This holds of course just a bushel; is lighter and more easily handled on account of its narrow shape. The baskets are the standard size, while the crate used in my county has deeper baskets. If these baskets get mixed it creates a nuisance, as is well known by growers of the two localities. It is impossible to get all sections to agree on one style of crate and basket, as it is to get all men to agree on a certain variety of strawberry. In the West they use a crate much like a box, but light and airy. These may be packed closely together and all the room is utilized in shipping. The quart boxes are square and fit snugly in the crate, the crates holding either sixteen or twenty-four quarts. This crate is always given away with the fruit, and is used almost exclusively in the Mississippi Valley. It has never become popular in the eastern part of the United States. Larger crates than the sizes mentioned are sometimes used, but they should be discouraged because the price received for strawberries is often affected by the size of the crate. People want a small package. To show how the price has changed in the cost of crates and baskets, I can cite you the crate used in our county. When filled with baskets it formerly retailed for \$2.50. Now you can buy a serviceable crate of the same pattern, filled with baskets, but of course not put to-

gether quite so strongly, for just thirty-six cents. Baskets used to sell at one cent each. Now you can buy the stuff and have them made, four baskets for a cent.

MARKETING.

There have been great changes in the system of marketing strawberries. The local market has always been the best and is still so in most cases. But in the means necessary to secure a practical monopoly, or even hold that market, there has been a great change. There was a time when a strawberry grower could drive to town and leave his crates of berries at the grocery and have them sold, now you can leave them there if you wish, but they will not always be sold. Your rival will drive to the same place and when he sees your berries at the grocery, will start out and peddle his and thus get rid of them for sure, while yours remain at the grocery. Competition grows keener as the country grows older, the efforts necessary to dispose of your productions must be redoubled. There was a time also when you could market berries in baskets and crates of indifferent color and age. The people now demand new baskets and clean crates and they want the berries at the door. The successful berry man of the future must peddle his berries from door to door or take second prices.

This change, while hard for those who are used to the old ways and not in a mood to change, is after all the best. It enables the grower of berries to meet the consumer and thus better learn his likes and dislikes. If reputation counts for anything, a man can sell his own products better than some one else. Thus is the out-put increased and the middleman's profits saved to a large degree.

When berries are shipped to a distant market it is a good plan before one goes into the business very extensively, to find out the varieties that sell best, by consulting commission men and grocers or visiting the markets in person. Select a good commission house and send to them year after year. I have

sent to the same firm in New York for twelve years, ever since I began shipping there. I can assure you it has paid far better than to divide my shipments and send to Tom, Dick and Harry. When my berries arrive at the commission house, they are cared for in preference to those from men who ship to that firm irregularly. They have a reputation, too, and are often sold before they arrive, to the same grocers who have had them year after year. Sending as I do to the same firms, induces many of my friends also to ship there and the business of the commission man increased. Every year the commission man comes to see me and talking matters over, we keep in close touch, to our mutual advantage.

The means of transportation of berries to distant markets is being improved yearly. Possibly Hudson River and the Atlantic Coast have the most ideal system. The cooling effects and lack of jar when berries are shipped by water cannot but operate to the best advantage.

In Oswego county we send by iced cars to all the leading markets of the East, New York, Philadelphia, Baltimore, Boston, Buffalo, Cleveland and even to far distant Chicago, over 800 miles away. The ice system is the only practical system at the present, but the ice injures the flavor of the berries and I shall never be satisfied till we get a train put on that will take berries picked in the forenoon and land them in the city of New York the next night, ready for the early morning markets. The time is soon coming when strawberries grown in our locality can with the new methods of compressed air or gases be laid down in all the principal cities of the United States, even in New Orleans and San Francisco. And what can be done with our berries can be done with others that ripen earlier in the season like yours in New Jersey.

MR. BAIRD. In speaking of the importance of having people that you can depend upon to take the new varieties

without losing their profit, I wish to state that the New Jersey Horticultural Society recognizes its importance by having a standing committee on new fruits and plants, to which such matters may be referred and then have them report to the Society.

MR. FARMER. In speaking of this new method, I want to say that I have tried it with success for five or six years, and that counts for more than theory, but I do not want to recommend any one to set out a whole field by this method for the first year, yet I would like to have all strawberry growers try it on a small scale the coming year.

MR. CREELEY. What manure is the best?

MR. FARMER. I find horse manure is the best, which we can get delivered at a dollar a load and fifty loads will cover an acre.

MR. CREELEY. What time do you apply it?

MR. FARMER. We calculate to cover our berries December 1st, but we would prefer to cover them before the ground is frozen. I have seen many patches ruined by being covered early in November. You cannot smother your berries if you put it on after the ground is frozen. You have to wait until it is frozen, but not thoroughly frozen. Just enough to prevent the wheels of wagons from cutting in the soil.

MR. CREELEY. What time do you take it off in the Spring?

MR. FARMER. We rake the coarse off into the aisles between the rows and leave the larger part between the plants when the plants begin Spring growth. It acts as a mulch. I have never practiced thinning. It is a good idea. Plants will bear better about six inches apart.

MR. GOBEL. How far apart do you set them in the rows?

MR. FARMER. Rows five feet apart and plants one foot apart in the rows.

MR. GOBEL. Do you set them on a ridge?

MR. FARMER. On low ground undrained on a slight rise. The worst weed we are troubled with is the mouse ear chick weed. It forms a fine green mat, covering the ground in the Fall, and in the Spring it comes up like moss over the whole plantation and smothers out the plants. There is a way to get around that by cultivating deeply between the rows. Along the first of October haul the loose dirt up covering the small plants and the weed, and smother out this weed and the plants will grow up out of the soil.

MR. CREELEY. What varieties do you ship to different markets?

MR. FARMER. The variety question is a hard one to answer. Our plan in the future will be to get the largest sizes and best qualities. We find that the most profitable is the Atlantic and you will find that is the most popular variety in the country to-day. This last season was the most wonderful season we have had. Some made \$1000 an acre, some \$500 and some \$300, and in many cases farm mortgages were paid off and men who were hopelessly in debt, early in the season, at the end of the crops were out of it. The tendency this year will be for more people in our section to engage in it, which will result in lower prices. We ship to Chicago and Detroit as the result of the World's Fair exhibits.

MR. GILLINGHAM. What time did you begin picking?

MR. FARMER. We picked berries in May last year, which is earlier than we generally do. We had two weeks of home marketing with no competition and secured good prices. The Bederwood was the best early berry we have tried.

MR. DECOU. Is not Bederwood a little dull in color?

MR. FARMER. Berries vary in color in different sections of the State. I believe in high manuring. 26 to 28 loads of manure to the acre. Our friend Mr. Repp can give you a little talk on irrigation.

THE CHAIRMAN. Mr. Repp can speak on the subject.

MR. REPP. You irrigate in a dry time and you do not want to put water on the berries. I irrigate about three acres when it is dry. Three years out of five we have a drought.

MR. FERRELL. Is your soil a light one?

MR. FARMER. It is a stony upland, and the stones are so thick you can dig ditches ten feet wide and fill them with the stone you take off, and this drains the land as it has a hard subsoil. Every strawberry farm has to be drained, and this in a way furnishes irrigation. Of course the irrigation depends largely upon the soil. I would not admire anyone who spends thousands of dollars to irrigate strawberries.

MR. DECOU. Can you give any new varieties?

MR. FARMER. The Marshall is a good berry for our county. Like the Sharpless, it is frequently destroyed by the frost during blossom time. There are varieties that will stand frost. The Parker Earl is the best berry I have tested as to standing frost while in bloom. Beverly not a success.

MR. DECOU. How about the Timbrell?

MR. FARMER. It is a fair one.

MR. DECOU. What others?

MR. FARMER. I like the Marshall, Brandywine, William Belt. Mr. Crawford selects these three and I would, too. The Splendid is a good berry.

MR. MANDA. In our section the Mary was the finest berry we had last year.

On motion Mr. Farmer was tendered a vote of thanks.

THE CHAIRMAN As Prof. Voorhees who was to deliver a lecture yesterday was not present, but is here to-day, he will be heard at this time if there is no objection.

GROWING OF APPLES IN THE STATE.

BY PROF. E. B. VOORHEES, DIRECTOR N. J. EXPERIMENT STATION.

My main purpose in the preparation of this paper is to answer in part, at least, the questions that are usually asked by those who contemplate entering the business of apple growing in this State. These answers are the result of a careful study of the statistics gathered in 1894-95 concerning this crop, and therefore really represent the aggregate wisdom and experience of the growers of the State, rather than opinions of my own. The question first in natural order is: 1. What kind of soil shall be selected?

In answering this question no set rules can be laid down that will apply in all cases, yet if growers will carefully study their situation and adopt the methods now in use by successful growers, who are working under similar conditions, and successful because they understand the principles which underlie their work, it will result in great progress in the industry.

The state possesses a wide variety of soils, and a study of their chief characteristics separates the counties into the following groups:

Northern.

Bergen.
Essex.
Hudson.
Morris.
Passaic.
Sussex.
Warren.

Central.

Hunterdon.
Mercer.
Middlesex.
Monmouth.
Somerset.
Union.

Southern.

Atlantic.
Burlington.
Camden.
Cape May.
Cumberland.
Gloucester.
Ocean.
Salem.

As indicating the differences that exist between soils in the same class in the different groups, it may be said that a gravelly soil in the northern group will differ widely in character from a gravelly soil in the southern, though both may be well adapted for apple growing; the northern differs from the southern in being much richer in natural fertility. The same is true of a sandy soil, that of the southern section consists more largely of sand than that of the central or northern; and a soil described as a clay in the central section contains more clay, is more finely divided, and is more compact than a clay soil of either the southern or northern section.

The kind of soils and subsoils upon which apples are successfully grown are shown by the replies to differ widely, thus emphasizing the suggestions already made.

Of the 781 reporting, 414, or 53 per cent. of the whole number, mention as best, sandy or gravelly soils, with sandy or gravelly subsoils; 105 sandy soil, with clayey subsoil; 168 clay soil and subsoil, and 94 clay loam with clay subsoil.

As already indicated, this selection of soils is governed largely by location. For instance, in the northern section, gravelly soils predominate, whereas in the central section, clayey soils are in the larger proportion, and in the southern section, sandy soils, as is shown by the distribution in the different groups. That is, it is not to be inferred that a sandy or gravelly soil, with sandy or gravelly subsoil, is the best always, but rather that if you have the choice that should be selected.

A good type of soil for apples is one which is open and porous, and with a subsoil not too compact. These physical qualities permit the ready and deep penetration of the roots and the easy circulation of air and water, the latter serving directly as food and in making food available, besides they carry the food throughout the soil. These soils are also naturally well drained. Naturally a soil and subsoil of a sandy or gravelly nature possesses these characteristics in a marked

degree. When the mechanical conditions are favorable, the after-growth of the tree and the character of the fruit depend upon the care given in reference to management and manuring, though the lighter soils which possess these characteristics must necessarily require more of added fertility than those which together with these possess a greater natural strength, or more of the elements of fertility.

For example, a large proportion of the apple orchards reported as most profitable are located in Monmouth and Burlington counties, on soils possessing the physical character mentioned, but which are not rich in natural fertility. The value of these orchards is not due altogether to the favorable character of the soil; they are the best because with good mechanical properties of soil, they have been well managed and abundantly supplied with needed plant food. In the central and northern sections, many of the best orchards reported have never been fertilized or manured, because they possess both the essential physical and chemical qualities in a marked degree, and are capable with good management of sustaining a vigorous growth of tree and fruit.

Certain varieties, however, are reported as influenced to some extent by the physical character of the soil and subsoil, aside from an abundant food supply. As, for instance, a gravelly soil with gravelly subsoil, seems better adapted for the Smith's Cider and Ben Davis, than if the subsoil is clayey or sandy, while a sandy subsoil is better adapted for the Red Astrachan.

The reports strongly indicate that the early sorts are better adapted to a warm loam, and the late sorts to a well drained clayey soil, which is in accord with well known principles.

The location of the soil, or its exposure, is also a matter of some importance, particularly in the higher lands of the northern part of the State. High land with a northwest exposure is mentioned as the best location 115 times, as against 39 times for a north exposure and 42 times for a south.

By exposure is meant the direction of the slope rather than that the orchard should be unprotected. It is believed that soil with exposure to the north or northwest is not so quickly influenced by the temperature changes in Winter, and does not warm up so rapidly in Spring, as a southerly one which receives the direct rays of the sun, thus in the former case lessening the danger of the loss of the blossoms or buds by frost. Low land in valleys is regarded as unsuitable, doubtless because of this danger of frost, as but forty of the whole number mention this position for their orchards.

The second question is : The selection of varieties.

A factor which perhaps has quite as great an influence in determining profit from an orchard as any other, is the varieties of fruit chosen. Their proper selection depends upon a number of circumstances, chief of which is the demands of the market, though location in reference to market and character of soil are also matters that should be carefully considered. The demands of the market should be studied from two stand-points. First, in reference to the kinds of fruit demanded, that is, whether the primary consideration is for fruit of high quality, or whether the appearance of the fruit alone is the main point. As a rule, our leading markets are governed less by quality of fruit than by appearance. For example, a red apple, highly colored, though poor in quality, will sell more quickly and for a higher price than an apple of another color, though of a much better quality, either for dessert or household purposes.

It is argued with considerable force by many, that to produce apples of poor quality, though profitable at the present time, will in the long run really injure the fruit industry. While it is a good business principle to cater to the demands of the consumer, it is a question whether the farmer cannot afford to assist in his education, even though it is discouraging to secure poorer returns for the outlay of time and money in the production of varieties of good quality than for others of a

poorer quality, which, as a rule, may be grown more cheaply. Under these circumstances, it would seem to be a good plan for all growers to include at least a few sorts of high quality in their selection.

In the second place, the market should be studied in reference to its demand for fruit at different seasons. In recent years, Summer or Fall apples have been so abundant that their production has not been profitable for the general grower, while Winter apples have, with few exceptions, met a ready sale at fair prices. These facts should not be taken as an argument for not planting the Summer or Fall varieties, since the location in reference to markets has an important bearing on this point. Growers located within a short distance of the large towns and cities, who can market their apples almost immediately after packing, either personally or through local agents, do secure better returns than those living at a distance who, therefore, incur greater risk in shipping, and who have to depend for their sale altogether upon commission men.

The character of soil, while as already stated is not so important a factor, still exercises an influence on this point. The Summer and Fall varieties usually thrive better upon the light, early soils, while the Winter sorts generally do better upon the heavier and colder soils.

The number of varieties to plant should also be determined to some extent by the location and the size of the orchard, since in small orchards where only local markets are to be supplied, a larger number of varieties which succeed each other may be grown to advantage, while fewer varieties would prove better in the long run in large orchards, or in orchards located at a distance from the market. In the latter case, the fruit may be shipped in large quantities, and the few varieties would be better than too many, since a few of many varieties does tend to reduce to some extent the prices that are received. Exporters and large dealers prefer to receive a consignment of a carload of one variety, rather than a portion

of a carload consisting of several varieties. In the case of Winter apples, especially, fewer varieties might serve better than in the case of the Summer or Fall sorts, which do not keep under ordinary climatic conditions for any length of time.

Further comments as to varieties are derived entirely from the statistics secured.

Of the 717 growers who reported a list of their best market varieties, but few individual growers reported more than ten, yet the total number of varieties reached 114. In many cases, one or two of the rarer sorts would be mentioned in connection with four or five of what may be regarded as "standards"—standard in the sense that the trees are hardy and are prolific producers, and because the fruit has a good appearance and possesses good shipping and other marketable qualities. For instance, 39 varieties were mentioned but once, 14 were mentioned but twice, in fact 81 varieties, or 71 per cent. of the whole number were mentioned ten times or less. The following fifteen varieties and the number of times they were mentioned, indicate very strongly that the familiar sorts are more largely grown:—

<i>Variety.</i>	<i>Times Mentioned.</i>
Baldwin,	323
Smith's Cider,	189
Hagloe,	146
Ben Davis,	116
Orange Pippin,	100
Maiden Blush,	96
Red Astrachan,	87
Fallawater,	81
Greening,	81
William's Early Red,	46
Newtown Pippin,	31
Northern Spy,	28
Roman Stem,	28
Bellflower,	26
Sweet Bough,	26

It does not follow from this, perhaps, that those mentioned the greatest number of times are the *best* varieties to grow for market ; it is only cumulative evidence that these are regarded as valuable sorts for the market. The section in which the fruits are grown also influences the order in which varieties are chosen, though all of those already indicated are included in the first ten selected for the different sections of the State.

THE SECTIONS AND THE FIRST TEN BEST VARIETIES CHOSEN.

<i>Northern.</i>	<i>Central.</i>	<i>Southern.</i>
Baldwin.	Smith's Cider.	Hagloe.
Greening.	Baldwin.	Smith's Cider.
Fallawater.	Ben Davis.	Red Astrachan.
Bellflower.	Orange Pippin.	Fallawater.
Smith's Cider.	Red Astrachan.	Orange Pippin.
Northern Spy.	Greening.	Baldwin.
Ben Davis.	Nyack Pippin.	Ben Davis.
King.	Pelican.	William's Early Red.
Newtown Pippin.	Newton Pippin.	Roman Stem.
Monmouth Pippin.	English Codlin.	Maiden Blush.

It will be observed, from a study of these lists, that the influence of location on the selection of varieties is quite marked. For instance, in the northern section, with one exception, all are Winter apples ; in the central, two Summer and one Fall apple are included ; while in the southern section, the ten include four Summer and one Fall apple.

While the varieties mentioned as best for these different sections may not be the most profitable in all cases, they serve as a safe guide both as to the proportion of Summer, Fall and Winter varieties, and as to the kinds that may be depended upon as well adapted for the sections. The Baldwin, Ben Davis and Smith's Cider are included in all of the sections, though they do not possess the best edible or household qualities, thus emphasizing the point as to the demands for fruit of good color. The following varieties, many of them well

known, and most of them of excellent quality, are quite largely grown, and may with advantage either be added to or substituted for some of the varieties included above: Sweet Bough, Lippincott's Early, Golden Pippin, Golden Russet, York Imperial, Jonathan, Primate, Snow, Spitzenburgh and Wealthy.

The third question is: Shall the trees be set in the Fall or Spring, and how far apart?

The chief points to be considered in connection with this question are the preparation of the soil for the trees, the age of the tree to be planted, the time to set the trees, the distance apart and the source of the stock. Before setting the tree, the soil should be in a good state of cultivation, well drained and free from weeds. The majority of growers prefer to have the land in cultivated crops for at least two years previous to setting, and where the land is at all heavy and the subsoil compact, it should first be either drained or subsoiled.

The age of the tree is not so important, perhaps, as its vigor, hardiness of growth and stockiness. The best trees are not always those of the largest size. A two year old tree, well grown, straight and stocky will do as well as an older tree.

The time of planting is also to some extent governed by circumstances, though many arguments are brought forward in favor of both Spring and Fall planting.

A few of the many advantages claimed for Fall planting by Prof. Bailey are that * "The trees become established during the open weather of Fall, and they usually make a start in the Spring before the ground is dry enough to allow of Spring planting. This early start not only means a better growth the first season, but, what is more important, trees which get a very early hold upon the soil endure the drouths of mid-summer much better than trees planted in Spring. Planting is nearly always better done in the settled weather and workable soil of Fall than in the capricious days and in the hurry

* "Hints on the Planting of Orchards," Bulletin 69, Cornell Experiment Station L. H. Bailey.

of springtime ; and the orchardist is free to begin cultivation at a time when he would be otherwise planting trees. Again, it is generally better to buy trees in the Fall, when the stock of varieties is full, and when the best trees are yet unsold. In Fall planting, however, it is important to insist that the trees shall be thoroughly well matured. It is true that unless the conditions are right, Spring planting is the safe course, and farmers who have many Fall crops to harvest, will also find more time for tree setting in the Spring.

The distance apart at which trees should be set in the orchard is a subject of considerable controversy among the best growers, and the tendency seems to be rather toward close setting and severe pruning. Trees that are set too close, unless they are severely pruned do not produce as perfect fruit as those set a greater distance, which permit the full effect of sun and air. It is also of great advantage in cultivating, spraying and harvesting to have plenty of room. The character of the soil, however, should guide somewhat in this respect. Upon strong soils, where the tendencies are toward a rapid and large growth, the trees should be placed at a greater distance than upon the lighter soils where the growth depends more upon, and can be controlled by, the character of the feed. On good strong soil a distance apart not less than forty feet would probably be better in the long run than any closer setting.

The practice of growers in respect to these points, indicates that the larger number prefer two year old trees ; practically all of the growers of the northern section, and 83 of the 105 reporting from the central section reporting this age as best ; only 13 report three year old trees as the best ; 6 prefer one year old, and 3 four year old. In the southern section 87 of the 167 report three year old trees, 74 two year old, 5 four year old, and 1 one year old as best. Thus it appears that upon the stronger soils, the two year old trees are preferred, while on the lighter soils of the southern section, the older tree is regarded as best.

The distance apart is also influenced, as already indicated by the character of the soil, the distance ranging from 30 to 45 feet in the northern section, from 30 to 40 in the central and from 30 to 38 in the southern. The average distance for the northern and central is $33\frac{1}{2}$ feet. The average distance for the southern is 31 feet.

The Spring is mentioned oftener than Fall for the season of setting the orchard, in fact nearly all of the growers prefer the Spring. Of the 69 growers in the northern section, 59 report the Spring as best; in the central section, of the 144 growers, 122 report Spring; while in the southern section out of 297 reporting, 141 set in Spring and 106 in the Fall. This difference of opinion in reference to location seems, however, to be more a question of convenience than a difference of opinion as to the best time of setting, so far as the good of the tree is concerned. In the trucking section, particularly, Spring is the busiest season.

As to the source of stock, the majority of growers favor their local nurseries, and practically all report that the stock is true to name. The source of stock is indicated very nicely by the replies received from the southern section. Of the 329 reporting, 249 purchase from local nurseries, 57 from New York nurseries, and the remainder indicate various sources of supply. Of the 249 securing their supply from local nurseries, 29 report that varieties are not always true to name, and of the 57 purchased from New York nurseries, 15 report varieties not true to name.

Formerly many complaints were made that trees purchased from agents, or from nurseries located at a distance, were not always true to name.

The fourth question is: Is it necessary to cultivate the orchard and how shall it be accomplished?

The object in cultivating orchards is three-fold: first, to increase the active food in the soil by making available to the tree that which is otherwise inert; second, to prevent loss of

moisture by providing a loose mulch upon the surface, and third, the destruction of weeds. Of these three, either of the first are quite as important as the third, though the practice of many indicates that the latter is the primary object.

Of course, the character of the soil governs the value that may be derived from cultivation in the matter of feeding the plants. On soils well supplied with the mineral constituents, as the mountain soils in the northern section of the State, the clay and red shale in the central, and in the marl regions of the southern section, the influence of cultivation would be very much greater than upon the sandy soils, since in the former there is a larger supply of dormant substances which are gradually made active by frequent cultivation, which exposes a larger area of soil to the solvent influences of the atmosphere, while in the southern section, because the soil is not rich in plant food, the frequent cultivation does not aid in feeding the plant to such an extent. On the sandy soils and those overlying shale, the retention of moisture as a result of proper cultivation is perhaps of greater importance than the immediate gain in active plant food, for by a constant stirring the water that would be evaporated rapidly and from the surface of the soil is retained in the lower layers, where the roots are located, and the evaporation which takes place is from the leaf rather than from the surface of the soil.

The destruction of weeds, which is accomplished by cultivation, is also very important, inasmuch as the weeds appropriate both food and moisture, which would otherwise be at the disposal of the tree, besides preventing an accumulation in the orchard of foreign growths, which furnish an excellent medium for the development of insects and diseases.

The question as to whether orchards should be cultivated or not depends, then, to a large extent, upon whether the land contains or may be supplied with the food required without any direct improvement of the soil by cultivation; whether under average conditions of season and climate the tree re-

ceives sufficient water for the full growth of tree, as well as the perfected development of the fruit, and whether the orchard can maintain a crop of fruit and a crop of weeds with the accompanying evils of the latter. There are undoubtedly situations where the conditions are such as to enable the tree to acquire sufficient food without cultivation, though in such cases it would be better to have the orchards pastured, rather than to allow them to grow up with weeds and other foreign growth. The experience of the past few years, however, teaches that there are few situations where orchards do not suffer from lack of moisture, and that uncultivated orchards suffer more than those in which frequent cultivation is practiced.

The statistics gathered show that of 813 growers, 295 report that their orchards are in sod, and are, as a rule, pastured. The distribution of the orchards in sod confirm to some extent the theoretical considerations given above concerning the objects to be secured in cultivating. In the northern section, which has already been described as possessing soils of a high natural strength, of the 238 growers, 138, or 58 per cent., report their orchards in sod. In the central section, of the 204 growers, 90, or 44 per cent., so report; while of the 371 growers in the southern section, 67, or but 18 per cent., allow their orchards to remain in sod. Of the remaining number, 20 in the northern section report clean cultivation, 37 crop cultivation, 15 plow once annually and 28 plow occasionally. In the central section, 24 report clean culture, 7 crop cultivation, 31 cultivate or plow once annually and 52 plow occasionally. In the southern section, 122 report clean culture, 154 crop cultivation, 6 cultivate or plow once annually and 22 occasionally.

This indicates either a wide diversity of opinion on this point, or the growers regard their orchards as secondary to other crops. There is no systematic practice as in the case of potatoes or wheat, for instance, but rather a tendency to attend

to the orchard when other duties have been performed. If time allows the orchards are cultivated, otherwise no attention is given them. In other words, growers are not yet able to regard the apple crop in the same light as other crops, which in many cases are of much less importance.

Those who report crop cultivation refer chiefly to the fact, that in the early life of the tree vegetables or small fruits are grown among the trees ; but very few grow crops after the trees come into bearing, when, as a rule, the orchards are seeded and plowed only occasionally. Those who plow once annually, as a rule, plow in the Spring, either allowing the land to lie fallow or seed with clover, and plow again the next year. This matter of cultivation, therefore, seems to resolve itself largely into a matter of situation and conditions. Those in the northern section cultivate less often, either directly for the purpose of improving or increasing fertility, or for maintenance of moisture. The natural conditions are good enough to provide for full crops, except in seasons of unusual drouth. It should be observed, too, that the cultivation should begin with the setting of the trees, in order that the roots may be kept well into the lower layers of the soil. If the orchards have been kept in sod in their early life, the tendency of the roots is to come toward the surface, in which case it would be better to allow the orchards to remain in sod, unless root pruning should be desirable, and if the trees show a lack of thrift feed heavily upon the surface with soluble food. This method is practiced by many with success upon soils that are not naturally dry.

The method to be adopted in the cultivation of orchards is a matter of some importance. As a rule the use of a cultivator or harrow is quite as good, if not better, than the plow, inasmuch as it can be handled more conveniently around the trees, and works deep enough to destroy the weeds and to provide a loose mulch for the surface.

The fifth question is: Is it necessary to manure, and

if so, what shall it be, and when and how shall it be applied?

It is sometimes argued that fruit trees do not need to be manured, though we have the strongest evidence of the necessity of a high state of fertility for apples, as well as for other crops, and also that the general principles of manuring which apply in the case of farm crops apply to fruits, that is, the essential constituents must be the same. The necessity for their application is found largely in the fact that although an apple crop is not a very exhaustive one, apple growing is really a continuous cropping of the same kind. There is an annual demand for the same kinds and proportions of soil constituents, hence the tendency to soil exhaustion is proportionately greater than where a frequent change of crops is practicable, differing in their requirements, both in respect to amount and proportion of the essential constituents.

The need of manuring is, too, made evident by the practice of the growers in the State. The reports from the north-section show that 133 of the 192, or 69 per cent., of the growers use manure of some kind. In the central section, 162 out of 177, or 91 per cent., use manures. In the southern section, 317 out of the 356, or practically 90 per cent., use manure. It is evident from these figures that the growers recognize the value of feeding even on the stronger soils of the northern section of the State. There, is, however, a very wide difference of opinion as to the kind of manure to use, though barnyard manure seems to be used to a greater extent than other forms. For instance, in the northern section, 89 use barnyard manure annually, 34 use it occasionally, 4 use commercial fertilizers exclusively, and 6 commercial fertilizers with manure. In the central section, 81 use barnyard manure annually, 25 use fertilizers, 23 barnyard manure and fertilizers, 30 use barnyard manure with lime or marl, and 3 use commercial fertilizers in connection with green manures. In the southern section, 194 use barnyard manure exclusively, 41 use

commercial fertilizers, 46 commercial fertilizers with barnyard manure, 11 lime and barnyard manure, 5 commercial fertilizers and green manure, and 20 miscellaneous products, as hair, wool, waste, muck, etc.

The only objection offered by those using barnyard manure, and it comes mainly from the northern section, is that this form frequently causes an abnormal growth of tree. Those who use the commercial fertilizers are able to control the proportion of nitrogen, which is the element in the manure which has the tendency to unduly increase the leaf and wood growth, and hence these report excellent results from the use of fertilizers. In many cases, too, where the fertilizers are used in connection with crops, the proportion of nitrogen which is absorbed by the trees is probably less than where it is used directly for the trees. The amounts used of the yard manure range from five to twenty tons per acre. There is apparently no system followed, it is rather a "hit or miss" plan, applying either when they may be secured cheaply, or when it may be a convenient time to make the application.

In the case of manure and fertilizers, the fertilizers added consist mainly of variously proportioned mixtures of ground bone and muriate of potash, applied in varying amounts from 200 to 1000 pounds per acre. In the use of commercial fertilizers alone, more intelligence is exercised; the trees have been studied somewhat as to their needs, and the materials are better proportioned and they consist very largely of the mineral elements, phosphoric acid and potash, a mixture frequently used being an even mixture of ground bone, acid phosphate and muriate of potash. One not so often used being a mixture of ground bone and muriate of potash. These mixtures of minerals are frequently applied in the Fall, and, if crops are grown, an additional application of a more active fertilizer in the Spring. The yard manure seems to have been applied at any time when most convenient, though largely in the winter

Many also give cautions against the too liberal use of manures or fertilizers early in the life of the tree, especially on the stronger grounds of the central and northern sections. These soils seem to be sufficiently well supplied to enable a normal growth of tree, and they do not require food until crops are harvested. Where the land is cultivated, the fertilizers are simply harrowed into the surface, though a number do take pains to plow them in, in order that the food may more readily reach the roots of the tree.

The final point, which is perhaps the most important of all, namely: Will it pay to raise apples? is a question which the statistics are unable to answer fully. In fact, while all the growers know the area, the varieties, the soil, etc., very few seem to have any definite idea of their yield per acre, or the prices received from year to year. Of the 957 growers, but 347 gave any information concerning cost of cultivating, trimming, manuring and harvesting, and but 333 were able to give any information concerning the yield per acre, and in neither case was the information full in all points. These, however, show that the average yield per acre for 1893 and 1894 was 52 barrels, the average gross value, \$69.48, and the average annual expenses, \$22.40, leaving a net value less cost of selling of \$47.08 per acre.

The range in yield was from 25 barrels to over 100 barrels, and the gross income per acre from \$25 to something over \$200. Assuming that the \$47.08 represents fairly the average amount received per acre, less cost of selling, we have an item for selling which practically no one of the growers was able to answer in a satisfactory manner. In a great many cases, particularly in the southern section, sales are direct to the consumer, thus no actual outlay is necessary, or deduction due to expenses of sale, but in the northern and central sections, in nearly all cases there is a very considerable sum that should be deducted for these expenses. On the whole, however, there seems to be a considerable promise in the growing

of apples in this State, though, in my judgment, it depends upon the adoption of some systematic and business-like methods along the lines mentioned, namely, the selection of varieties, care and management of the orchard, and disposing of the fruit. At present apple growing seems to be, in too many cases, regarded as a side issue instead of a definite branch of their work.

THE CHAIRMAN. If any one wishes to ask Prof. Voorhees any question, now is the proper time to do it.

On motion of Mr. Beebe, Prof. Voorhees was tendered a vote of thanks.

THE CHAIRMAN. Will the secretary please see if there are any questions in the box?

Question 14. Do English gooseberries ever appear in quantities in our markets?

DR. WARD. I have watched the gooseberry market pretty closely, and I think there are very few. There is very little demand for them.

MR. ROGERS. I would say in many instances it does not pay the freight to market them. Two to three cents per quart is a high price for them.

Question 15. Is there ever a glut in the market for very large currants?

DR. WARD. Yes, decidedly, when three or four growers can glut the market. By glutting the market you get the price down and it is very hard to increase it. Especially can I speak of the Newark market for the last twenty years.

MR. ROGERS. I have a resolution here to read, which was handed me by Mr. Hale.

Resolved, That each member of this society be requested during the coming season to experiment with a fruit tree, by

giving it an extra liberal supply of fertilizer, and report the result at the next annual meeting of this society.

Mr. Baird moves that the resolution of Mr. Hale be adopted.

MR. HALE. I offered this resolution, as it was in accordance with the president's address. A similar experiment has been tried by the Agricultural Association, of which I am a member, and I have seen some profitable results from it. There would not be much risk and certainly very little loss. I think the reports would be very interesting.

MR. BEEBE. It is impossible to fertilize a tree and have the result show in one year. I coincide with the idea, but you cannot expect results from it in one or two years. Of course, if you take a young tree you can see its foliage, the growth of wood, etc., but if you take a diseased or stunted fruit tree and expect to recuperate it in one year, you cannot do that. So much depends upon what they take. If the resolution were amended by including a series of experiments and report as the benefit was shown, I should feel more like voting for it.

MR. ROBERTS. I think the resolution is right. We cannot learn the whole story in one year, but we can see the results.

MR. HALE. My idea was to take at least a healthy tree.

MR. BAIRD. I have no doubt the result is all right. You apply the manure and report the effects.

MR. DYE. If the farmers would keep records of their business more than they do, they would be greatly benefited. That is what we want at this meeting, and at the State Board and at next year's meeting.

The resolution as originally read was adopted.

Meeting then adjourned until 2 P. M.

SECOND DAY:—AFTERNOON SESSION.

Meeting was called to order at 2 P. M.

THE CHAIRMAN. The first in order this afternoon will be reports of committees. Is there any committee ready to report?

Mr. Vanderveer, chairman of the Nominating Committee, reported the following for officers for 1897: For President, J. B. Ward; Vice President, I. W. Nicholson; Secretary, Henry I. Budd; Treasurer, Charles L. Jones.

(For complete list of officers see page 2.)

THE CHAIRMAN. What action will you take upon this report?

MR. ROGERS. I would move, sir, that the report be received and the secretary cast a ballot for this society.

The motion was unanimously carried.

The ballot was cast and the secretary announced that the officers as named by Nominating Committee were elected.

THE CHAIRMAN. You have heard the result of the ballot. The gentlemen whose names have been read off are elected for the ensuing year.

MR. ROBERTS. I think we have done all that the Fruit Committee can in making a report on the fruit lists handed in, and we have it in shape so that the secretary can tabulate the returns and hand it over to the Executive Committee.

MR. BLACK. If the secretary needs our assistance in any way, it will be at his command.

THE CHAIRMAN. If there is no objection the report will be handed over to the secretary.

MR. HALE. I would ask whether this is the idea of the committee's work, that this revised list should go out as coming from this Horticultural Society when they, as a body, have never passed upon it.

THE CHAIRMAN. If the resolution is passed as proposed, to hand it over to the secretary, of course it goes out as the voice of the Horticultural Society.

MR. ROGERS. I have been engaged in two or three lists from time to time and it has always been done in that way. It has been handed over and tabulated.

The resolution was adopted.

MR. BEEBE. Is there any report of the fruit on the table?

THE CHAIRMAN. I called for the reports of the committees and there has been no response made in regard to it.

MR. BLACK. The special committee in regard to that fruit is not ready to report.

THE CHAIRMAN. Mr. Horace Roberts will now favor us by reading his paper.

MARKETING OF FRUITS.

BY HORACE ROBERTS, FELLOWSHIP, N. J.

The principle of marketing anything to advantage consists in giving people what they want, when they want and as they want it; and the remuneration from any business is in proportion to the thoroughness with which this simple idea is

carried out. Now as for giving people just what they want, let us lay aside all æsthetic ideas, for one minute and consider what it is people want. Do they want something good? Assuredly they do. But is good fruit what they crave most? No, what is most desired in any market and especially the wholesale markets, is something beautiful. The palate will excuse almost anything if the eye is only satisfied. Fortunate indeed is the man who, when he made out his fruit list in the beginning, considered the demands of his market instead of the tastes of some epicure. I grant that there are buyers who appreciate quality and who will buy nothing but the finest flavored fruit. But any dealer who is well enough trained to appreciate flavor is generally wise enough to buy at the prevailing market prices, and beauty is queen of every market, wholesale or retail, and, for that matter, oftentimes the social as well. Our finest flavored and most delicate fruits, as a rule, stand on a level with the second grade of our attractive looking fruits. Go into almost any wholesale market in the Fall of the year and you will find Lawrence pears and cull Kieffers selling at about the same price. Such apples as the Roman Stem priced on a par with the cull Ben Davis. I know there are many exceptions to this sweeping rule, and also realize that it is possible in a limited way to educate the purchaser. But in a business way it gives more satisfaction all around, if we are willing to lay aside our pride and self-conceit and expend our energies in the direction in which they will do the most good, and supply people with just what they want, something large, high colored and beautiful.

When it comes to putting fruit on the market at a time when the demand is the most, nearness is a great advantage and enables us to establish and maintain a regular trade, which is always the most satisfactory and profitable.

Mr. Hale's talks on the marketing of fruit, so full of good business ideas and delivered in such a genial way, should be an inspiration to any fruit grower. His idea of establishing a

good name and then being able to obtain better prices because of his reputation, is no theory but an idea that we each can carry out to advantage. People like to excuse little frauds by saying that there are tricks in all trades but ours. It is easy to see that in an ethical way, "Honesty is the best policy," but it is harder to realize how true it is in the business world. The fact so much fruit is dumped on the market in a slovenly, deceitful manner, gives a grand opportunity to each grower who will take the pains to put his goods on the market in a careful, honest, systematic manner. Buyers are seldom particular in regard to flavor, but they are generally willing to pay a premium for fruit sold under a brand which they know can be depended on.

The only obstacle in the way of Jersey men establishing reputations is that they are blessed with such good markets, which will generally take fruit in almost any condition at a profitable price to the grower. How nicely the California fruit we see in market is packed and graded. Is it because the people of California are shrewder or more conscientious than we are? No. The secret for the difference is that the Californians are driven to this care by our competition. They have been taught over and over again that unless their fruit is shipped in a model condition they will have to pay for the privilege of putting it on the market to have it repay the freight.

Occasionally a dull year like the last is a blessing to those engaged in growing and handling fruit. It stimulates more care and system in grading and marketing. It enables those who have heretofore regarded fruit as a luxury to use it, and enlarge the sales another year. It also has a tendency to weed out our more slovenly and faint hearted competitors.

Where growers have been able to club together and pool their products, the results have generally been satisfactory. The peach growers of Delaware and Maryland by these means, for several years, were able to dispose of their fruit to much

better advantage. Some form of co-operation in disposing of fruit, both fresh and dry, is almost universal in California. This system has great advantages. It is generally easier to sell a large quantity of anything than a smaller one. Whoever has a small quantity of fruit to sell has to seek a market, but it is possible to have sufficient to bring the market to you, and then do away with the expense of keeping an army of middlemen. A large grower or a union of smaller ones are able to market goods with more economy and system, and, as a rule, have more uniform and salable products. The peach raisers of Delaware and the fruit growers of California were driven by necessity to work together. It would be much more difficult for us to form any system of co-operation because of our nearness to so many and such good markets. I believe we could do better working together, but we can do very well working independently, and I think the system recommended by Mr. Hale, of establishing good names for individuals, the only feasible method at this time. The Philadelphia Milk Exchange is, I think, composed mostly of farmers of New Jersey and has been a great advantage to all its members, and a still greater advantage to those not members, and I fully believe any union of fruit growers at this time would be attended by like results.

Where fruit growers are located within hauling distance of cities or large towns, they can very often retail their loads to advantage, right from their wagons, especially in times of glut or depression. The retail markets are much more stable than the wholesale. Consumers pay nearly the same for their goods whether the wholesale price is high or low.

I want to speak one good word for the hardest working and most abused of all merchants, the commission man. He works early and late. He is found fault with on every hand, but as a rule is honest and faithful. A good commission man is a friend worth having, but unless you can make friends with him you had better do without him. There is only one

way to make friends with a commission man. Can you all tell me what that is? It is by sending him plenty of good produce in good order. I have been bold enough to take the unpopular side and say I believe the commission merchants are, as a rule, honest. I will go just one step further, and say that I do not believe the majority of the shippers of fruit from New Jersey realize what they lose by their careless packing. It would pay every grower to sell his own fruit long enough to be taught how to prepare it for market.

After using various methods of disposing of my fruit, I feel justified in saying when it has been good enough I have often realized better prices from the commission men in the wholesale markets than from any other method. The law of the survival of the fittest holds full sway in the jam of the wholesale markets, and the shipper whose goods are not up to the standard generally suffers the consequence.

A vote of thanks was given to Mr. Roberts and the paper placed in hands of Executive Committee.

THE CHAIRMAN. Mr. Miller will read his paper on Peach Culture.

PEACH CULTURE.

BY SAMUEL A. MILLER, DECKERTOWN, N. J.

Mr. President, members of the State Horticultural Society and ladies and gentlemen:

Necessarily my remarks apply to peach culture under the condition found in Sussex county, and I do not want my enthusiasm to induce any one to plant an orchard, because I do not think there is any section in the Union where within the distance of fifty or sixty miles there is such a radical change of geological formation as there is in the northern portion of this State, among the mountain regions of Warren and Sussex counties, and between that and the flat sandy regions of the central portion. The changes are so very great that what may

be true of one section may not be true of another, but of course there are some general truths which will apply to either section. My enthusiasm is almost without limit. Not only do I love the pursuit itself, to see a little twig grow and in a few years be a wide spreading tree and in the Fall produce that luscious fruit which even the artist cannot imitate. I not only like the pursuit from its sentimental standpoint, but I have also implicit faith in it when you come right down to the hard matter of dollars and cents, because I think there are few, if any, crops in garden, orchard or field which can be planted on the hills of New Jersey, where the conditions are right which will give for the money and labor expended as large a return as the peach. This applies only to an orchard planted in a soil suitable and adapted to that particular variety and then the return will be handsome, but I know of no more disastrous failure if the conditions are not just right. A peach orchard is well suited to the man of small means. The cost of the trees, the little fertilizer needed is comparatively small, and then too a great many of the best peach lands are comparatively cheap, as they are not adapted to other crops and are rather far from transportation facilities and not suitable for market garden crops, and much of the best peach lands are so rough that the cultivation of small fruits on them would be difficult. We know pretty well what they are in Sussex County. One of the gentlemen here said on his farm you had to dig a ditch ten feet wide to bury his stones. If he tried that experiment in Sussex county, he would be twice as bad off as he was before. I actually think we have stones ten to eleven feet wide on my farm, but just plant a nice row of apple trees and they will never need any cultivation.

Speaking of men of moderate means going into this business, I know they might feel discouraged when they read of the magnificent scale on which others have gone into it, more especially in Georgia. They will make money out of it in years to come. Many of us, if we had money to invest like

Hale would not care whether we invested it or not. There was a man down in North Carolina who thought he would saw his timber and convert it into cash, so he wrote to the owners of a saw mill in Chicago and told them what sort of timber he had and how he wished to work it up and said he had about \$500, which he could invest in a mill. The Chicago firm furnished him with a statement showing that he could have a mill put up for about \$1500. He was mad and sat down and wrote a letter in which he said: "You blamed fool, if I had \$1500, what do you think I would want of a saw mill." So if we had as much money as Hale has invested we would not care whether we had a saw mill or a peach orchard. The large investors should not discourage the small ones, who can begin by investing a small amount.

I found that the Susquehanna was the largest producer, but they have been unproductive with me. Take the county over, what is considered a shy bearer with most others has an immense crop with me. In growing fruit you want the right location and a man must understand his business, and then if his heart is in his work he is apt to succeed. The matter of location, while it is important in growing of all fruits, is most so with the peach. First of all, an orchard must be thoroughly drained. It may be so stony that you will have to dig the holes with a pick-axe, but it must be free from bogs. It must be dry land. Low land with an abundant nitrogen supply is the worst. There will be a larger growth of wood accordingly than of fruit. On the other hand you must not select a field so poor that you would not expect it to raise a crop of beans. Take an upland field, where you might expect to grow a crop of corn and that is a good field on which to raise a crop of peaches. I would give it a moderate dressing on the sod of stable manure, plow it deeply and thoroughly harrow it. If you tear up the sod it makes quite a rough top on it. I would plow the field a year before and put it in corn. The next year plow the stubble and tear up the subsoil. Plow

thoroughly and cross-harrow. Plow in furrows sixteen feet apart. I find it best, and plow a good deep furrow, and then stake out crosswise across these furrows. Put a corn cob every sixteen feet a'd then by means of two or three tall sticks you can walk from the cob on one side of the field to the cob on the other side, and just stick a cob in each furrow as you cross it, and I find it accurate enough for all purposes. If you are careful with your work and walk straight it will be plot well enough. When the trees come from the nursery the side limbs need to be taken off within a sixteenth of an inch of the stem and the stem cut back considerably. I like them from eighteen inches to three feet in height, according to where I see the best buds. If the trees are dry when received soak them for twenty-eight hours in water. They will grow much better after being soaked. If you soak them too long the buds might drop. Mr. Hale recommends planting with a crow-bar—that is in the South. It might not do so well here. Let one man hold the tree in position and another shovel fine dirt on the roots. The man holding the tree in position gets down on his knees and works the soil in solid about the roots with his hands, and the man shovelling in the dirt selects the very best and richest soil he can find. After the roots are pretty well covered, the man which held the tree gets on his feet and presses the soil down good and hard with his feet. The poor subsoil is placed on top, the richer about the roots. Soon the buds on this little tree will start out, and I prefer leaving three buds on stock to form the three branches than leaving a bud each on three laterals, pruned back close to the stock as the trees come from the nursery. I prefer them close together. Mr. Hale prefers them six inches apart. He thinks the tree is less liable to break, but it does not make so handsome a tree. I find if the buds all come out an equal distance as may be around the stock there is no danger of splitting. When you have selected these three buds rub off all below and keep them rubbed off

during the season. The second year I do not hesitate to put a crop of corn on the land. Leave four feet in all directions about the trees. The next Spring after planting you want to thin out the intervening branches and keep on doing so all the time. The more you prune a peach tree the thicker top it will make and the longer lived it will be. In cultivating the orchard I find the plow almost indispensable, as the ground is very hard and stony. Keep cutaway harrow running until June. It cultivates the ground well.

As to varieties, it is very difficult to advise any one what to plant. My favorites are the Crawford Late and Pride of Franklin. The Crawford is a good seller but the Pride of Franklin is the handsomer. It is more delicately tinted. Its looks sells it, as it does every other variety of fruit. It is, in fact, as good as the Reeves. We want nothing but late peaches because the early ones come when the glut is on the market. The city markets are comparatively bare late in September and then we get fancy prices. In marketing, the first point is to be honest in the packing. I do all this work by hand. It is very difficult to get pickers who will not bruise the fruit more or less. Many people make a mistake when they manure peaches with stable manure. A little of it is a good thing, but too much of it (there being in it an excessive amount of nitrogen over the phosphoric acid and potash) makes too large a wood growth. It tends to injure the color, making the fruit green and also affects flavor of the peach. I might just illustrate that by telling you a little instance about color. It is nothing to my credit, but I happened to purchase a farm producing peaches of a high color, but we do get very high colored fruit in our section, more brilliant than they have the other side of Deckertown. A friend of mine raised some nice fruit and had been shipping his fancy grades in carriers. I was the first one to use carriers holding sixteen quarts in two baskets. I line the baskets with fancy paper and even cut some twigs from the trees, then fold the paper over the

top and they go into the market in fine shape. He had been getting \$2.50 for a carrier of sixteen quarts and he was very well satisfied. One day he went down to where he had shipped the night before. He stopped in a place on Barclay street, New York City (This was towards the close of the season.) and asked what they were selling my peaches for. They told him \$4 a carrier. He then went to his shipper and asked what they were getting for his peaches, and they replied \$2.50 and they were very nice. He said, "I have just seen Mr. Miller's peaches, and are not my peaches as good as his?" He was told they were as large but did not have the color. They said, "Here are some of Mr. Miller's peaches that came in this morning and we are getting for his seconds \$3, which is as good as \$4 for his first." I sent them in as coming from John Pitt—I presume Peach Pit. I do not say this boastingly, but there is something in my soil which gives that rich color. I asked Prof. Voorhees about it this morning and he was inclined to think it came from iron in the soil. I have been giving you some facts in regard to the practice of this industry where the conditions are favorable to the growth of the peach in our section of the State.

As to the profits in peach growing, a friend of mine, Mr. A. J. Baxter, whose orchards are on the same range of high land as mine, and who kept a reliable account of the proceeds from one and two-thirds acres of land, set to 150 Reeve's Favorite and 150 Crawford's Late, a total of 300 trees, planted 15 x 15 feet apart, in year 1888, which came into bearing in 1891, third year from planting. Yield, 1,008 baskets; net returns, \$508; 4th year, 1892, 1,038 baskets; net returns, \$966; 5th year, 1893, 2,038 baskets; net returns, \$706; 6th year, 1894, 250 baskets; net returns, \$200; 7th year, 1895, 1,600 baskets; net returns, \$900. The total net returns for consecutive crops, or for eight years from setting the trees, was \$3,280, and the total yield, 5,914 baskets; net returns per acre, 5 years of bearing, per year, \$1,966, or \$245.75 per year per acre for each of the eight

years the land was occupied by the orchard. Average yield per tree a little over $19\frac{2}{3}$ baskets; net returns, 55 cents per basket, or \$10.90 per tree.

He took extra good care of these trees. He made one mistake. He did not thin his fruit and it did not grade fancy on that account. You see, his average price per basket was not so high, but he got an enormous amount of baskets, but I think he would have done better if he had thinned them out and had one-half the number of baskets.

Another gentleman in our locality I cannot speak so positively about. He sold 1100 baskets from 163 trees, planted on one acre of land, of the Bray's Rare Ripe, which netted him over \$700 per acre. Near the orchard of Mr. Baxter's, referred to above, is a much larger one of 1,800 trees. They were planted at the time of Mr. Baxter's, but the owner was obliged to give up the farm and a party bought it for \$3,000, paying \$1,500 down and \$1,500 mortgage, and within the last five years he has paid off the entire mortgage, and has this last year bought another farm, which cost him \$11,000, and has made payments on that besides his running expenses all the while.

Question. Have you any statistics of your own production?

MR. MILLER. No, I could not give any statistics of my own. My peaches in 1895 averaged over one dollar a basket. Of course I have told you about the carriers that were sold at \$4 and a great many were sold at \$3 and \$3.50. I had some poor ones which did not net me twenty-five cents a basket. I believe in quality not quantity. I think nothing will pay a fruit grower like thinning the fruit on the trees. I spent the whole month of July, 1895, in pulling them off the trees. Some knock them off with a stick. I used a step-ladder, and picked over 300 peaches from some trees about six years old and threw them on the ground. You get better returns as the peaches are larger. If you let them all remain on the trees they will be small and of poor flavor, but if you

pull one-half or two-thirds off eighty or ninety will fill a sixteen quart basket. If not you will have 175 to 200 to a sixteen quart basket.

MR. BAIRD. Have you any rule to recommend the distance apart to leave them on the tree?

MR. MILLER. I leave them two inches apart.

MR. HALE. I used to say four, now I say six.

MR. MILLER. I want to endorse what Mr. Roberts says, that there is no better way to market our fruit than to pack it in an honest way and sell it through an honest commission man. They have a trade.

MR. BAIRD. How many grades do you make?

MR. MILLER. Five. Extra fancy, fancy, both shipped in carriers containing two baskets each, sixteen quarts in all; No. 1, No. 2 and culls, shipped in sixteen quart baskets.

MR. BLACK. What is the difference between Crawford Late and Pride of Franklin?

MR. MILLER. Pride of Franklin is a seedling of Crawford's Late. It originated in Hunterdon county. They ripen about the same time, the Pride a few days later. The Pride bears as well at three years old as the Crawford at four. It is handsomer than the Crawford and the flavor is infinitely better.

MR. BLACK. I cannot distinguish any difference between the two, either in color or flavor.

MR. MILLER. What about Susquehanna and Wheatland?

MR. BLACK. No difference. They ripen about the same time as Crawford's Late, but Wheatland is a little hardier.

MR. BEEBE. Have you tried any experiments with iron?

MR. MILLER. No, I think the experiment station has?

Question. Does Mr. Baxter feed his trees liberally?

MR. MILLER. This was an exceptionally good place. It was part of an old pasture, in which a large dairy of cows had been yarded for a great many years, and perhaps it had all the elements in the soil necessary to fertilize it.

MR. BUDD. What is the life of trees in your section?

MR. MILLER. When they have been forced like Mr. Baxter's and had good returns from them I put them at eight years, five crops. Where they are slow growers you might make them live seventeen, but you would not get as much money out of them as you would in eight years.

A vote of thanks was tendered Mr. Miller for his address.

Mr. Dye then offered the following resolution :

Realizing the power of the Press as a means of disseminating valuable information, we notice with much satisfaction the full and correct report of the proceedings of this meeting, as published in the *State Gazette* and *True American* of this city and the *Public Ledger* of Philadelphia. Through these reports many will be benefitted who could not be at the meeting; therefore,

Resolved, That the thanks of this society be and are hereby tendered to the papers named, and to any others thus co-operating in our work.

The resolution was passed and referred to the Executive Committee.

MR. VANDERVEER. I think there is a committee to report yet.

Mr. Black, chairman of the Committee on Fruit, exhibited on the table, stated that he found some very fine specimens and read as follows :

REPORT OF COMMITTEE.

We find extra fine specimens of Nero, Cooper's Market and a new apple called Banana, from C. E. Blackwell, of Titusville.

Specimens of Wagner, Shockley and Mann, from Charles Black, Hightstown.

Fine specimens of Ben Davis, Lawver and Mann from Horace Roberts, Fellowship.

Plate of fine showy apple (correct name not known), Northern Spy, Cooper's Market and Baldwin—these are all fine, well grown, perfect fruit, from Samuel A. Miller, Deckertown.

Specimens of Japan Giant and Japan Mammoth chestnut, also two varieties of Japan walnut, from William Parry, Parry.

A vase of flowers containing McGowan, Scott, Della Fox, Kitty Clover and Buttercup carnations, and Bride, Bridesmaid and Reece roses, from E. B. Beebe, Elizabeth.

CHARLES BLACK,	} Committee.
JOHN REPP,	
THOMAS BEANS,	

Report received with thanks to committee and committee discharged. Report handed to Executive Committee.

On motion the meeting adjourned.



The following large selected nuts seldom fail to produce large fine fruit at three or four years of age :

Japan Giant—"Parry's"—grafted direct from the genuine Giant tree ; largest nuts known.

Pedigree Japan Mammoth, nuts of immense size.

Alpha—Japan (grafted)—The earliest known chestnut. Ripens September 5th to 10th, without frost.

Beta—Japan (grafted)—Ripens September 10th to 15th.

Early Reliance—Japan (grafted)—Ripens September 18th to 20th.

Success—Japan (grafted)—Ripens September 20th to 23d.
 Parry's Superb—Japan (grafted)—Is an enormous bearer.
 Spanish Chestnut is a handsome tree, yields abundantly.
 Numbo—Spanish (grafted)—Very hardy; very productive.
 Paragon—Spanish (grafted)—Hardy; productive, large
 and excellent quality.

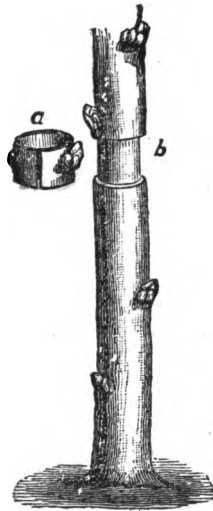
Ridgeley (grafted)—A large variety of Spanish chestnut.
 Very good quality.

Hannum—Tree very vigorous; immensely productive.

Comfort—A large, handsome nut; comes to fruitage
 young; enormous bearer.

SCHAEFFER CHESTNUT.

E. ROBERTS. It is nearly identical with Great American, now known as Paragon. Care must be taken to have both stock and scion in good condition. The scion particularly should be dormant, and yet plump and ready to quicken and start into active growth as soon as the current between the stock and the graft is established.



This cut illustrates ring grafting.
 b ring of bark taken from branch of
 tree. D the ring taken from scion
 to be placed in b.

FRUIT LIST.

COMPRISING VARIETIES MENTIONED IN FRUIT
LISTS ONLY ONCE.

BURLINGTON COUNTY.

Apples—American Golden Russet, W. 3 ; Bismark, W. T. ; Parlin Beauty, A. 4 ; Salome, W. T. ; Stark, W. T. ; Starr, S. 5 ;

Strawberries (for trial)—Gardner, Glen Mary, Mastadon, Ponderosa, Salzers Earliest.

Raspberries—Winnewaski, M. R. 5.

Grapes—Cottage, E. B. 5.

MERCER COUNTY.

Apples—American Summer Pearmain, S. 4 ; Cogswell, W. 4 ; Early Ripe, S. 5 ; Garrettson's Early, S. 5 ; Jonathan, W. 5 ; Pomme Grise, W. 5 ; Rachel, T ; Sweet Pippin, W. 5 ; White Doctor, A. 3 ; Willow Twig, W. 4.

Peaches—Family Favorite, M. W. 3 ; Golden Beauty, T. ; Late Rare Ripe, 5 ; Moore's Favorite, M. W. 5 ; Pride of Franklin, 4 ; Red Rare Ripe, 5 ; Susquehanna, M. Y. 2 ; Thurber, T. ; XX Yellow, 2.

Plums—Green Gage, M. G. 5.

Grapes—Diamond (Moore's), M. W. 4 ; Ulster Prolific, E. R. 4.

PLAN OF LIST.

For Full Merit mark 5 ; for Less Merit 4, 3, 2, 1, as the case may be.

A variety that has been tested and found to be Without Merit, mark o.

A variety that is recommended for Trial should be marked T.

A Blank Space will signify that the variety is Not Known, hence not reported upon.

The names in *Italics* are synonyms.

FRUIT LIST.

ABBREVIATIONS :—S. for Summer ; A. for Autumn ; W. for Winter.

APPLS.	Season	Atlantic County.	Burlington County.	Camden County.	Rose- County.	Hunterdon County.	Middlesex County.	Mercer County.	Monmouth County.	Union County.	Total Merits.	Possible No. Merits.
Alexander	A.	..	..	..	..	..	3	3	3	0	9	15
Baldwin	W.	5	4	4	4	5	4	4	4	5	39	45
Ben Davis	W.	..	5	3	3	5	5	5	5	4	35	40
Cooper's Market— <i>Cooper's Redling</i>	W.	..	4	4	..	5	5	4	4	..	26	30
Cornell's Fancy	S.	..	4	..	..	5	..	4	..	..	13	15
Early Harvest— <i>Princes' Early Har- vest ; Yellow Harvest</i>	S.	..	5	5	3	3	..	4	5	4	29	35
Fall Pippin	A.	5	4	..	5	3	..	3	5	3	28	35
Fallowater	W.	..	4	..	4	3	..	3	3	4	21	30
Fameuse	W.	..	2	..	..	2	..	2	..	..	6	15
Gravenstein	S.	..	3	..	3	2	5	5	5	2	25	35
Grimes' Golden	W.	..	5	5	..	2	5	4	4	5	30	35
Hagloe	S.	5	5	5	..	..	..	4	3	..	22	25
Hyslop Crab	A.	..	4	..	5	3	..	4	..	2	18	30
Hubbardston— <i>Hubbardston Nonesuch</i>	W.	4	4	..	..	4	4	4	4	4	24	30

Lawver— <i>Delaware Red Winter</i>	W.	5	4	..	3	T.	T.	..	..	..	..
Maiden's Blush	A.	..	4	5	3	5	5	4	..	4	30
Mammoth Black Twig— <i>Paragon</i>	W.	..	T.	..	..	T.	T.	T.	..	..	..
Mann	W.	..	T.	..	..	..	T.	T.	..	..	..
Monmouth Pippin— <i>Red Cheek Pippin</i>	W.	..	2	..	..	5	5	3	4	3	22
Moore's Sweet	W.	..	..	..	..	5	5	5	..	..	..
Nero	W.	..	5	..	..	5	5	5	4	..	24
Northern Spy	W.	..	2	..	3	4	3	0	0	5	17
Newtown Pippin	W.	..	2	..	..	5	..	4	4	4	19
Nyack Pippin— <i>Summer Pippin</i>	S.	..	3	5	..	..	..	5	4	..	17
Ohio Nonpareil	A.	..	..	..	..	T.	T.	T.	..	..	..
Oldenburg-Duchesse of Oldenburgh	A.	..	4	..	5	4	4	4	4	5	30
Orange Pippin	A.	..	4	5	..	..	..	3	5	5	22
Pennock— <i>Pelican</i>	W.	..	3	..	3	4	4	4	4	..	22
Plum's Cider	A.	..	4	..	..	..	..	..	..	..	4
Porter	A.	5	3	..	2	..	..	4	3	4	21
Primate— <i>Belle Rose</i>	S.	3	5	..	3	2	..	5	4	..	22
Red Astrachan	S.	..	4	5	2	2	5	3	5	..	26
Rhode Island Greening	W.	1	3	..	4	3	3	2	3	5	24
Ridge Pippin	W.	..	3	3	..	4	4	3	4	..	21
Roman Stem	W.	..	3	5	..	4	4	4	5	..	25
											30

FRUIT LIST.—CONTINUED.

ABBREVIATIONS :—S. for Summer ; A. for Autumn ; W. for Winter.

APPLS.—CONTINUED.	Season	Atlantic County.	Burlington County.	Camden County.	Essex County.	Hunterdon County.	Middlesex County.	Mercer County.	Montmouth County.	Union County.	Total Merits.	Possible No. Merits.
Rome Beauty.....	W.	..	3	..	..	..	..	..	..	..	3	5
Roxbury Russett.....	W.	5	3	..	3	4	4	3	3	5	30	40
Smith's Cider.....	W.	5	4	4	4	5	4	5	4	3	38	45
Summer Rose.....	S.	..	3	..	4	..	..	5	..	..	12	15
Sweet Bough.....	S	..	4	5	..	5	5	4	3	5	31	35
Tompkins County—King of Tompkins County.....	W.	..	3	..	4	..	..	4	1	..	12	20
Wagner.....	W.	..	2	..	..	3	..	5	..	5	15	20
Wealthy.....	W.	..	3	..	..	T.	..	2	2	5		
White Pippin—White Ohio Pippin.....	W.	..	..	..	..	2	2	2	2	..		
Williams' Early Red.....	S.	..	5	..	..	4	5	4	4	..	22	25
Winesap.....	W.	..	4	..	3	4	4	4	4	4	27	30
Yellow Transparent.....	S.	..	4	..	..	5	5	4	4	..	22	25
York Imperial.....	W.	..	4	..	..	5	5	5	5	5	29	30

FRUIT LIST.—CONTINUED.

ABBREVIATIONS.—S. for Summer; A. for Autumn; W. Winter.

PEARS.	Season.	Atlantic County.	Burlington County.	Camden County.	Knox County.	Hunterdon County.	Middlesex County.	Mercer County.	Monmouth County.	Union County.	Total Merits.	Possible No. Merits.
Bartlett	S.	5	5	5	4	5	5	5	5	5	44	45
Beurre d'Anjou	A.	..	3	..	4	4	3	3	3	4	24	35
Beurre Bosc	A.	..	3	..	4	2	2	..	..	5	16	25
Beurre Claireau	A.	..	4	..	3	4	..	3	3	5	22	30
Beurre Giffard	S.	..	4	..	3	..	..	4	3	5	19	25
Clapp's Favorite	S.	..	5	4	5	5	5	5	4	5	38	40
Duchesse d'Angouleme	A.	2	4	4	3	5	3	3	3	5	32	45
Garber	A.	..	4	..	..	T.	T.	T.	T.	..	..	..
Howell	A.	..	3	..	1	4	..	2	3	4	17	30
Kieffer	A.	5	5	4	3	5	5	4	5	3	39	45
Lawrence	W.	5	4	5	3	4	..	4	2	..	27	35
Le Conte	S.	..	4	..	..	..	..	4	4	..	12	15
Louise Bonne de Jersey	A.	5	2	..	2	3	..	3	..	2	17	30
President Druard	W.	..	..	..	..	T.	..	..	..	..	..	..
Seckel	A.	5	4	5	3	5	3	5	5	5	40	45
Sheldon	A.	5	4	2	4	4	3	3	4	5	34	45
Smith's	A.	..	3	..	..	..	..	..	..	..	..	..
Vicar of Winkfield	W.	5	2	..	..	3	..	3	2	2	16	30
Wilder	S.	..	..	..	..	..	..	T.	..	..	..	..

FRUIT LIST.—CONTINUED.

ABBREVIATIONS :—V. E. Very Early ; E. Early ; M. Medium ; L. Late ; W. White ; Y. Yellow.

PEACHES.	Season.	Color of Flesh.	Atlantic County.	Burlington County.	Rees County.	Hunterdon County.	Middlesex County.	Mercer County.	Monmouth County.	Union County.	Total Merits.	Possible No. Merits.
Alexander's Early	V. E. }	W.	..	2	..	3	..	3	2	..	10	20
Amsden's June												
Beer's Smock	L.	Y.	5	2	..	5	3	4	5	..	24	30
Champion	E.	W.	..	..	4	..	..	..	2	..	6	10
Crawford's Early	M.	Y.	4	3	3	5	..	3	3	5	26	30
Crawford's Late	L.	Y.	4	5	4	5	5	5	5	5	38	40
Elberta	M.	Y.	5	4	4	5	5	5	5	5	38	40
Ford's Late White	L.	W.	4	4	5	5	5	4	3	..	30	35
Poster	M.	Y.	5	2	..	3	1	3	2	..	16	30
Fox's Seedling	L.	W.	..	4	..	5	5	5	5	..	24	25
Globe	L.	Y.	1	2	..	4	..	2	2	4	15	30
Hance's Golden	M.	Y.	..	..	..	2	2	3	2	..	9	20
Keyport White	L.	W.	5	..	3	5	..	4	4	5	26	30

Large Early York— <i>Honest John</i>	E.	W.	..	3	..	5	5	5	5	5	28	30
Lemon Free	L.	Y.	..	..	..	..	..	T.	..	..	..	..
Mountain Rose	E.	W.	5	5	4	5	5	5	5	5	39	40
Oldmixon Free	M.	W.	5	5	4	5	5	5	5	5	39	40
Reeve's Favorite— <i>Red Neck</i>	M.	Y.	5	3	..	4	5	4	4	..	25	30
Salway	L.	Y.	5	3	..	5	..	3	1	3	20	30
Steven's Rareripe	L.	W.	5	..	..	5	5	3	2	5	25	30
Stump-the-World	M.	W.	5	5	..	5	5	5	5	5	35	35
Troth's Early	E.	W.	..	3	..	2	..	5	3	0	13	25

FRUIT LIST.—CONTINUED.

ABBREVIATIONS.—E. Early; M. Medium; L. Late; G. Green; P. Purple; R. Red; Y. Yellow.

PLUMS.	Season	Color of Flesh	Burlington County	Camden County	Hesse County	Hunterdon County	Middlesex County	Mercer County	Monmouth County	Union County	Total Merits	Possible No. Merits
Abundance	E. P & Y	4	5	5	5	5	8	5	5	5	39	40
Berkman's .....	..	..	..	..	T.	T.	..	..	T.	..	..	..
Bradshaw	E. P.	4	..	..	..	..	2	..	5	..	11	15
Burbank	E. P & Y	..	5	5	5	5	..	..	5	..	20	20
Chabot	M. P & Y	..	..	T.	5	5	5	5	T.	..	..	..
Damson	E. P.	3	..	..	..	..	..	..	5	3	8	15
Guin	M. P.	2	..	..	..	T.	..	..	..	..	..	..
Imperial Gage— <i>Prince's Imperial</i>	E. Y.	..	..	..	..	5	5	4	5	5	24	25
Lombard	E. R.	..	5	..	3	3	3	2	5	5	23	30
Newman	L. R.	..	5	..	..	..	..	3	3	..	11	15
Quackenboss	L. P.	..	..	..	..	..	..	3	..	..	3	5
Red June	V. E. R.	..	..	..	..	..	..	T.	T.	..	..	..
Reine Claude de Bavay	L. G.	..	..	..	3	..	..	..	5	5	13	15
Richland	M. P.	4	..	..	..	..	..	3	T.	..	..	..
Satsuma	L. R.	..	..	..	0	T.	..	T.	T.	..	..	..
Shropshire Damson	L. P.	..	..	..	..	..	..	..	4	5	9	10
Wickson	E. R.	..	..	..	T.	..	..	..	T.	..	..	..
Wild Goose	E. R.	4	..	3	5	5	..	5	5	0	22	30
Willard	V. E. R.	..	..	T.	..	..	T.	T.	5	..	..	..

FRUIT LIST.—CONTINUED.

ABBREVIATIONS:—B. Black; L. Light; R. Red; S. Sweet; T. Tart.

CHERRIES.	Color of Flesh.	Sweet and Tart.	Burlington County.	Camden County.	Cape May County.	Rossex County.	Hunterdon County.	Middlesex County.	Mercer County.	Monmouth County.	Union County.	Total Merits.	Possible No. Merits.
Black Eagle.....	B.	S.	..	..	..	5	3	3	4	3	4	24	30
Black Tartarian	B.	S.	..	5	5	5	5	5	5	5	5	40	40
Coe's Transparent.....	L.	S.	..	..	..	3	4	..	1	3	3	16	25
Downer's Late	R.	S.	..	..	..	4	..	..	5	4	4	17	20
Early Richmond— <i>Kentish</i>	R.	T.	5	4	..	4	5	4	5	4	5	36	40
Elton	L.	S.	4	..	..	..	5	..	..	3	4	16	20
English Morello	R.	T.	5	..	..	..	5	5	5	5	5	30	30
Gov. Wood	L.	S.	4	..	..	5	5	..	3	5	5	27	30
Louis Philippe.....	R.	T.	..	..	..	4	4	..	..	4	..	12	15
May Duke.....	R.	T.	..	..	..	..	5	..	5	4	..	14	15
Mercer (old variety re-named) ..	B.	S.	5	..	..	T.	..	..	..	T.	..	..	..
Montmorency	R.	T.	5	..	..	..	5	..	4	3	5	22	30
Napoleon Bigarreau.....	R.	T.	3	..	..	3	3	3	3	3	5	23	35
Olivet	R.	T.	..	..	..	..	..	..	..	..	2	2	5
Ohio Beauty.....	R.	S.	..	..	..	3	..	..	1	..	..	4	10
Reine Hortense.....	R.	S.	..	..	..	..	..	..	2	3	2	7	15
Rockport.....	L.	S.	..	..	..	4	3	3	3	3	..	16	25
Windsor	B.	S.	T.	..	..	..	T.	..	T.	T.	2	..	..
Yellow Spanish.....	L.	S.	..	..	..	..	..	..	3	4	..	17	10

FRUIT LIST.—CONTINUED.

ABBREVIATIONS :—Sex—P. for Pistillate; H. for Hermaphrodite or perfect; E. Early; M. Medium; L. Late.

STRAWBERRIES.	Sex.	Season	Burlington County.	Camden County.	Rosex County.	Hunterdon County.	Middlesex County.	Mercer County.	Monmouth County.	Union County.	Total Merits.	Possible No. Merits.
Bubach.....	P.	M.	4	..	4	5	5	5	..	5	28	30
Brandywine.....	H.	M.	4	..	4	..	..	T.	..	..	..	..
Charles Downing.....	H.	M.	3	4	3	5	4	2	3	4	28	40
Crescent.....	P.	E.	3	..	3	3	..	3	3	..	15	25
Cumberland Triumph.....	H.	M.	3	..	3	4	..	..	3	..	13	20
Enhance.....	H.	L.	4	..	3	..	..	5	5	..	17	20
Gandy.....	H.	L.	5	5	3	5	5	5	5	4	37	40
Greenville.....	P.	M.	4	..	..	5	5	4	5	..	23	25
Haverland.....	P.	M.	4	..	..	4	..	4	3	..	15	20
Kentucky.....	H.	L.	4	5	..	4	3	4	3	..	23	30
Marshall.....	H.	M	4	4	4	T.	T.	..	T.	..	..	..
Mary.....	P.	M.	..	..	..	..	..	T.	..	..	..	..
Michel's Early.....	H.	E.	..	3	2	4	..	4	5	..	18	25
Sharpless.....	H.	M.	3	5	3	4	3	4	3	5	30	40
Tennessee.....	H.	M.	3	..	2	..	..	..	5	..	10	15
Warfield.....	P.	E.	3	..	2	..	..	2	3	..	10	20
Wilson.....	H.	E.	3	..	0	3	2	2	4	5	19	35

FRUIT LIST.—CONTINUED.

ABBREVIATIONS :—E. Early; M. Medium; L. Late; R. Red; Y. Yellow; B. Black; P. Purple.

RASPBERRIES.	Season.	Color of Flesh.	Atlantic County.	Burlington County.	Camden County.	Essex County.	Hunterdon County.	Middlesex County.	Mercer County.	Monmouth County.	Union County.	Total Merits.	Possible No. Merits.
Brandywine	M.	R.	5	4	..	2	5	..	4	4	2	26	35
Caroline.....	M.	Y.	..	..	..	..	..	..	..	..	..	..	..
Cuthbert— <i>Queen of the Market</i>	L.	R.	..	5	5	5	5	5	5	5	5	40	40
Golden Queen	M.	Y.	..	..	..	..	..	..	4	4	5	..	..
Gregg ..	L.	B.	..	5	..	3	5	5	5	5	..	28	30
Kansas	M.	B.	..	..	..	..	..	5	5	5	..	15	15
Marlboro	E.	R.	..	..	..	..	..	..	..	..	..	..	..
Miller.....	E.	R.	..	4	..	..	..	5	5	5	..	..	..
Ohio.....	M.	B.	..	3	..	3	4	..	3	2	..	15	25
Palmer	E.	B.	..	4	..	..	T.	..	T.	T.	..	..	..
Shaffer's Colossal.....	L.	P.	..	3	..	3	..	5	5	4	0	20	30
Souhegan	E.	B.	..	4	..	4	5	5	5	4	4	31	35
Turner— <i>Southern Thornless</i>	E.	R.	4	3	..	..	5	..	5	4	..	21	25

FRUIT LIST.—CONTINUED.

ABBREVIATIONS:—E. Early; M. Medium; L. Late.

BLACKBERRIES.	Season.	Burlington County.	Essex County.	Hunterdon County.	Middlesex County.	Mercer County.	Monmouth County.	Union County.	Warren County.	Total Merits.	Possible No. Merits.
Early Harvest.....	E.	4	..	..	5	5	5	3	5	22	25
Early King.....	E.	3	..	5	5	5	5	..	4	23	25
Erie.....	M.	5	4	4	4	..	4	..	6	21	25
Kittatinny.....	M.	4	5	5	5	3	4	5	1	31	35
Lucretia (Dewberry).....	E.	4	..	3	3	5	4	3	2	25	30
New Rochelle— <i>Lawton</i>	L.	5	..	4	4	3	3	5	3	24	30
Wilson's Early.....	E.	4	..	5	5	3	3	5	2	25	30

FRUIT LIST.—CONTINUED.

ABBREVIATIONS:—E. Early; M. Medium; G. Green; R. Red; Y. Yellow.

GOOSEBERRIES.	Season.	Color of Flesh.	Burlington County.	Essex County.	Hunterdon County.	Middlesex County.	Mercer County.	Monmouth County.	Union County.	Total Merits.	Possible No. Merits.
Downing.....	M.	G.	3	4	5	5	5	5	5	32	35
Houghton.....	E.	R.	4	0	4	4	4	4	..	16	25
Industry.....	M.	R.	2	0	..	..	..	..	3	5	15
Pearl.....	M.	G.	..	T.	..	..	..	5	..	..	..

FRUIT LIST.—CONTINUED.

ABBREVIATIONS :—E. Early ; M. Medium ; L. Late ; R. Red ; B. Black ; W. White.

CURRENTS.	Season.	Color.	Burlington County.	Rosex County.	Hunterdon County.	Middlesex County.	Mercer County.	Monmouth County.	Union County.	Total Merits.	Possible No. Merits.
Cherry	M.	R.	4	4	5	5	3	4	5	30	35
Fay's Prolific.....	M.	R.	5	5	5	5	5	5	5	35	35
Lee's Prolific.....	M.	B.	..	..	..	..	..	..	..	..	..
La Versailles.....	M.	R.	4	4	5	5	4	5	4	31	35
Red Dutch.....	E.	R.	3	..	3	3	3	4	5	21	30
Victoria.....	L.	R.	4	..	3	3	3	4	..	17	25
White Grape.....	E.	W.	2	..	5	5	4	4	5	25	30

FRUIT LIST.—CONTINUED.

ABBREVIATIONS:—L. Late; M. Medium; E. Early.

QUINCES.	Season	Burlington County.	Essex County.	Hunterdon County.	Middlesex County.	Mercer County.	Monmouth County.	Union County.	Total Merits.	Possible No. Merits.
Champion	L.	3	5	5	..	3	3	4	20	30
Meech's Prolific	L.	4	..	3	..	3	..	4	14	20
Orange— <i>Apple</i>	M.	3	5	5	5	5	4	5	32	35
Rea's Mammoth	E.	4	4	4	5	5	4	..	26	30

FRUIT LIST.—CONTINUED.

ABBREVIATIONS:—E. Early; M. Medium; L. Late; V. E. Very Early; R. Red; B. Black; W. White.

GRAPES.	Season.	Color.	Atlantic County.	Burlington County.	Camden County.	Gloucester County.	Hunterdon County.	Middlesex County.	Mercer County.	Monmouth County.	Union County.	Total Merits.	Possible No. Merits.
Agawam— <i>Rogers' 15</i>	M.	R.	..	3	..	3	3	3	2	3	3	20	35
Barry— <i>Rogers' 43</i>	M.	B.	..	3	..	4	2	2	2	2	2	17	35
Brighton	E.	R.	..	5	..	5	4	3	2	4	5	23	30
Catawba.....	L.	R.	2	4	..	2	..	..	3	0	..	11	25
Champion— <i>Talman</i>	V. E.	B.	..	3	..	0	..	..	..	..	2	5	15
Columbian	M	B.	..	5	..	T.	T.	..	..	..	..	..	..
Concord ..	M.	B.	5	5	5	4	5	5	5	5	4	43	45
Delaware	E.	R.	1	3	5	3	4	2	3	3	3	27	45
Eaton.....	M.	B.	..	4	..	4	..	..	..	..	..	..	..
Empire State	M.	W.	..	5	..	..	5	5	5	5	..	25	25
Goethe— <i>Rogers' 1</i>	L.	W.	..	3	..	3	2	2	2	2	..	14	30
Green Mountain.....	E.	W.	..	5	..	4	4	..	..	4	3	20	25
Lady.....	E.	W.	..	3	..	0	3	2	2	2	4	16	35
Lady Washington.....	L.	W.	2	3	..	2	..	..	..	..	0	7	20
Lindley— <i>Rogers' 9</i>	M.	R.	..	3	..	3	..	..	4	3	4	17	25

FRUIT LIST.—CONTINUED.

ABBREVIATIONS :—E. Early; M. Medium; L. Late; V. E. Very Early; R. Red; B. Black; W. White.

GRAPES—CONTINUED.	Season.	Color.	Atlantic County.	Burlington County.	Camden County.	Essex County.	Hunterdon County.	Middlesex County.	Mercer County.	Monmouth County.	Union County.	Total Merits.	Possible No. Merits.
Martha.....	M.	W.	2	3	..	0	4	4	3	3	4	23	40
Moore's Early.....	V. E.	B.	5	4	5	0	5	5	5	5	..	29	35
Niagara	L.	W.	..	5	4	5	5	5	5	4	5	38	40
Pocklington.....	M.	W.	..	3	..	2	1	1	4	2	3	16	35
Salem— <i>Rogers' 22</i>	M.	R.	..	3	4	2	3	3	3	3	4	25	40
Vergennes	E.	R.	..	4	4	0	3	3	3	3	4	24	40
Wilder— <i>Rogers' 4</i>	M.	B.	..	3	..	5	4	3	2	..	4	19	30
Worden.....	E.	B.	..	4	..	5	4	4	4	5	5	31	35
Wyoming Red.....	V. E.	R.	..	4	..	0	4	..	8	15

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